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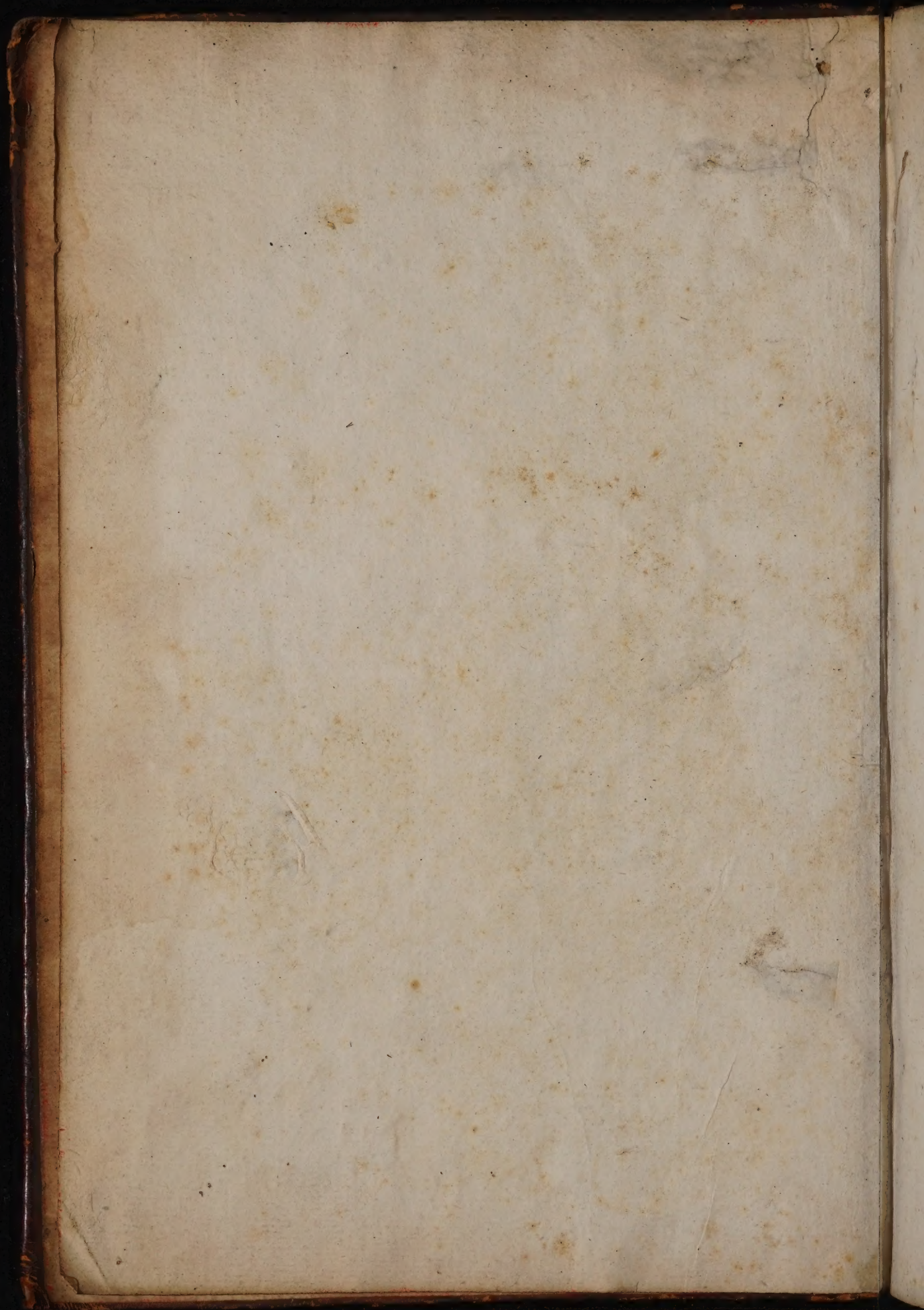
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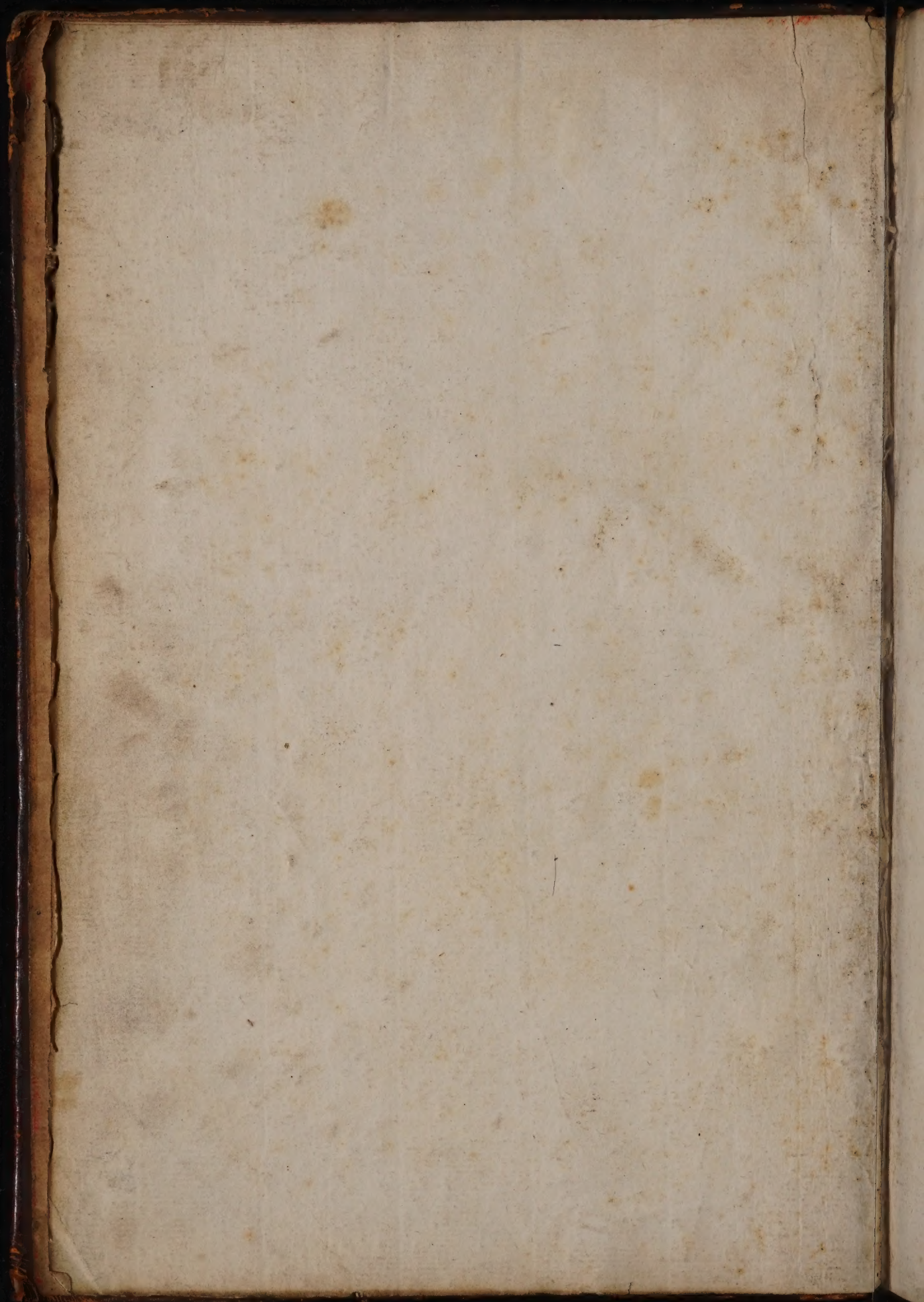
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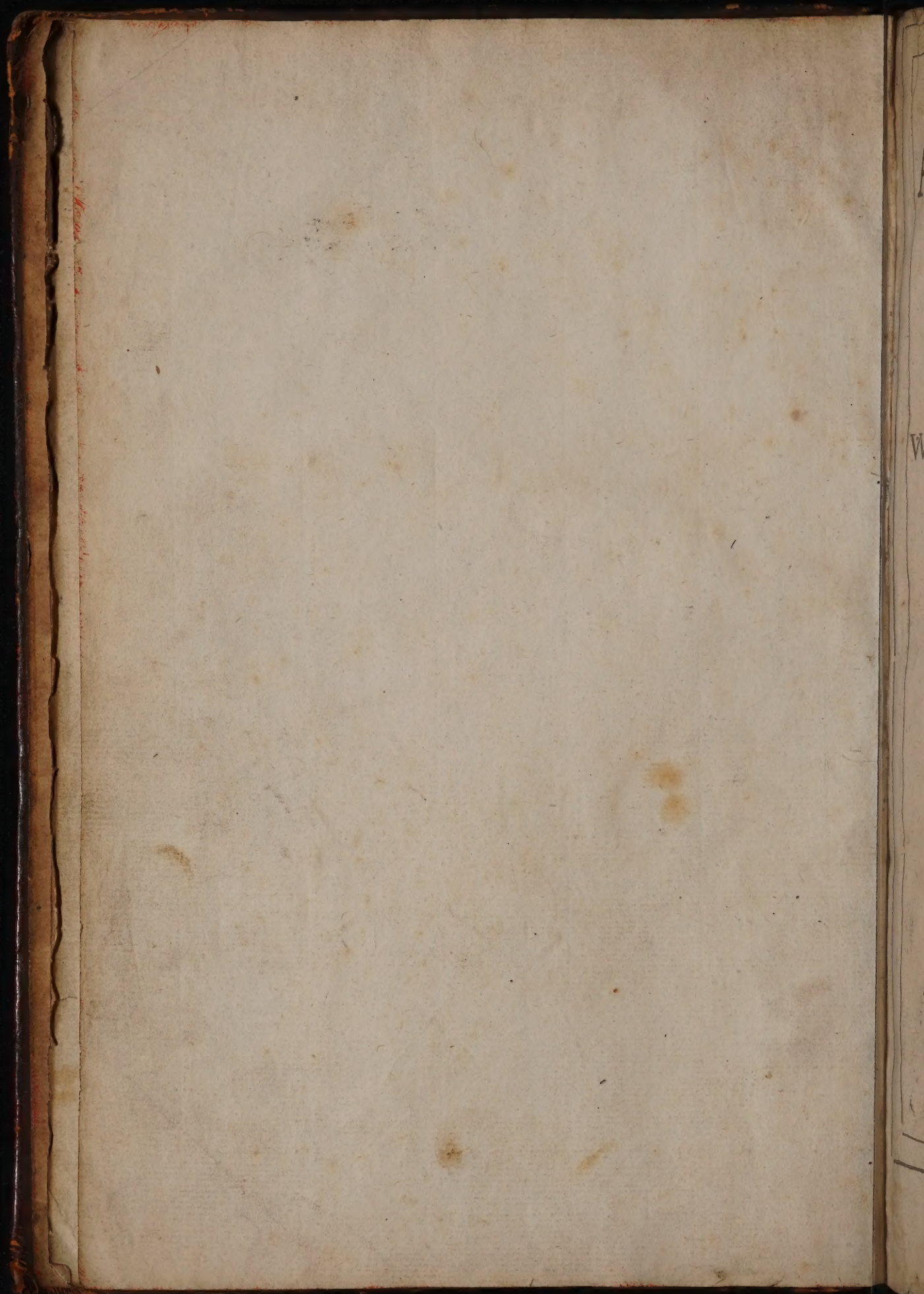
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NEW ATLANTIS.

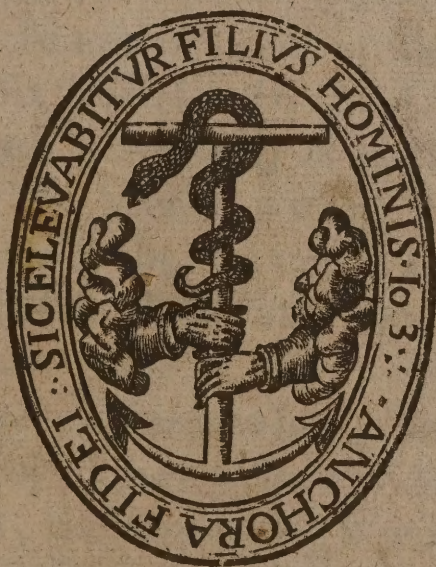
Rich. Byrne

A Worke vnfinished.

Written by the Right Honourable, FRANCIS
Lord Verulam, Viscount St. Alban.

Viscount

Rich. Byrne



ATLANTIS.

A Worke unfinished.

Written by the Right Honourable Francis Bacon
Lord Verulam Viscount of St Albans





To the Reader.

THis *Fable* my Lord deuised, to the end that Hee might exhibit therein, a *Modell* or *Description* of a *College*, instituted for the *Interpreting* of *Nature*, and the Producing of *Great* and *Maruellous Workes*, for the *Benefit* of *Men*; Vnder the Name of *Salomons House*, or the *College of the Six Dayes Workes*. And euen so farre his *Lordship* hath proceeded, as to finish that Part. Certainly the *Modell* is more *Vast*, and *High*, than can possibly be imitated in all things; Notwithstanding most *Things* therein are within *Mens Power* to effect. His *Lordship* thought also in this present *Fable*, to haue composed a *Frame* of *Lawes*, or of the *best State* or *Mould* of a *Common-wealth*; But fore-seeing it would bee a long *Worke*, his Desire of Collecting the *Naturall Historie* diuerted him, which He preferred many degrees before it.

This *Worke* of the *New Atlantis* (as
a 2 much

To the Reader.

much as concerneth the *English Edition* (his Lordship designed for this place ; In regard it hath so neare Affinity (in one part of it) with the Preceding *Naturall History*.

W. Rawley.

To the Reader.

This Table my Lord desired, to the
end that there might be exhibited there
in, a Model, or Description of a
College, instituted for the further
ing of Nature, and the Producing of
and Mathematicall Works, for the Benefit of
the Name of a learned House, or the
legit the six Dialects. And even to this
Lordship hath proceeded, as to finish that Part
Certainly the Model is more Vast, and High
than can possibly be contained in all things; Nor
understanding more things than in the world
Most overlooked. This Lordship thought it
to in this present Table to have composed a
of Nature, or of the State of Mind of a
man, but for feeling it would be a loss
V. or, his time of collecting the
Hence directed him which he printed many
degrees before it
This Work of the Year a Volume
a



NEW ATLANTIS.



EE sailed from *Peru*, (where wee had continued by the space of one whole yeare,) for *China* and *Japan*, by the South Sea; taking with vs Victuals for twelue Moneths; And had good Winds from the East, though soft and weake, for five Moneths space and more. But then the Wind came about, and settled in the West for many dayes, so as we could make little or no way, and were sometimes in purpose to turne backe. But then againe there arose Strong and Great Winds from the South, with a Point East; which carried vs vp, (for all that we could doe) towards the North: By which time our Victuals failed vs, though wee had made good spare of them. So that finding our selues, in the Midst of the greatest Wildernesse of Waters in the World, without Victuall, wee gaue our Selues for lost Men, and prepared for death. Yet we did lift vp our Hearts and Voices to G O D above, *who sheweth his Wonders in the Deepe*; Beseeching him of his Mercy, that as in the *Beginning* Hee discovered the *Face* of the *Deepe*, and brought forth *Drie-Land*; So he would now discover Land to vs, that we mought not perish. And it came to passe, that the next Day about Euening, we saw within a Kenning before vs, towards the North, as it were thicke-Clouds, which did put vs in some hope of Land; Knowing how that part of the South-Sea was viterly unknowne; And might haue Islands or Continents, that hitherto were not come to light. Wherefore we bent our course thither, where wee saw the Appea-

rance of Land, all that night ; And in the Dawning of the
 next Day, wee might plainly discern that it was a Land, Flat
 to our sight, and full of Boscage; which made it shew the
 more Darke. And after an Houre and a halfe Sayling, wee en-
 tred into a good *Hauen*, being the Port of a faire *City* ; Not
 great indeed, but well built, and that gaue a pleasant view
 from the Sea : And wee thinking euery Minute long, till wee
 were on Land, came close to the Shore, and offered to land. But
 straightwayes wee saw diuers of the People, with Bastons in
 their Hands, (as it were) forbidding vs to land ; Yet without
 any Cryes or Fierceneffe, but onely as warning vs off, by
 Signes that they made. Whereupon being not a little discom-
 forted, wee were aduising with our selues, what wee should
 doe. During which time, there made forth to vs a small Boat,
 with about eight Persons in it ; whereof One of them had in
 his Hand a Tipstaffe of a yellow Cane, tipped at both ends
 with Blew, who made aboard our Ship, without any shew
 of Distrust at all. And when he saw one of our Number, pre-
 sent himselfe somewhat afore the rest, hee drew forth a little
 Scroule of Parchment) somewhat yellower than our Parch-
 ment, and shining like the Leaues of Writing Tables, but o-
 therwise soft and flexible,) and deliuered it to our formost
 Man. In which Scroule were written in Ancient Hebrew, and
 in Ancient Greeke, and in good Latine of the Schoole, and in
 Spanisb, these words ; *Land yee not, none of you, and provide to
 be gone, from this Coast, within sixteene dayes, except you haue fur-
 ther time giuen you: Meane-while, if you want Fresh Water, or Victu-
 all, or helpe for your Sicke, or that your Ship needeth repaire, write
 downe your wants, and you shall haue that which belongeth to Mercy.*
 This Scroule was signed with a Stampe of Cherubins Wings, not
 spread, but hanging downewards ; And by them a Crosse. This
 being deliuered, the Officer returned, and left onely a Seruant
 with vs to receiue our Answer. Consulting hereupon a-
 mongst our Selues, wee were much perplexed. The Deniall of
 Landing, and Hasty Warning vs away, troubled vs much ; On
 the other side, to finde that the People had Languages, and
 were so full of Humanity, did comfort vs not a little. And a-
 boue

boue all the Signe of the *Crosse* to that Instrument, was to vs a great Reioycing, and as it were a certaine Presage of Good. Our Answer was in the *Spanish* tongue ; That for our Ship, it was well ; For we had rather met with Calmes and contrary winds, than any Tempests. For our Sicke, they were many, and in very ill Case ; So that if they were not permitted to Land, they ran danger of their Liues. Our other Wants wee set downe in particular, adding ; That we had some little store of Merchandize, which if it pleased them to deale for, it might supply our Wants, without being chargeable vnto them. We offered some Reward in Pistols vnto the Seruant, and a peece of Crimson Veluet to be presented to the Officer : But the Seruant tookethem not, nor would scarce looke vpon them ; And so left vs, and went backe in another little Boat which was sent for him.

About three Houres after we had dispatched our Answer, there came towards vs, a Person (as it seemed) of place. He had on him a Gowne with wide Sleeues, of a kinde of Water Chamolet, of an excellent Azure Colour, farre more glossy than ours : His vnder Apparell was greene ; And so was his Hat, being in the forme of a Turban, daintily made, and not so huge as the *Turkish* Turbans ; And the Lockes of his Haire came downe below the Brimmes of it. A Reuerend Man was he to behold. Hee came in a Boat, gilt in some part of it, with foure Persons more onely in that Boat ; And was followed by another Boat, wherein were some Twenty. When hee was come within a Flight-shot of our Ship, Signes were made to vs, that wee should send forth some to meet him vpon the Water, which wee presently did in our Ship-Boat, sending the principall Man amongst vs saue one, and foure of our Number with him. When wee were come within six yards of their Boat, they called to vs to stay, and not to approach further, which wee did. And there-vpon the Man, whom I before described, stood vp, and with a loud voice, in *Spanish*, asked, *Are yee Christians ?* Wee answered ; Wee were ; fearing the lesse, because of the *Crosse* we had seene in the Subscription. At which Answer the said Person lift vp his Right Hand towards Heauen, and drew it softly

to his Mouth (which is the Gesture they vse, when they thanke GOD;) And then said: *If yee will sweare, (all of you,) by the Merits of the SAVIOUR, that ye are no Pirates; Nor haue shed bloud, lawfully, nor unlawfully, within forty dayes past, you may haue License to come on Land.* We said; *We were all ready to take that Oath.* Whereupon one of those that were with him, being (as it seemed) a Notarie, made an Entry of this Act. Which done, another of the Attendants of the Great Person, which was with him in the same Boat, after his Lord had spoken a little to him, said aloud; *My Lord would haue you know, that it is not of Pride, or Greatnesse, that he commeth not aboard your Ship; But for that, in your Answer, you declare, that you haue many Sicke amongst you, he was warned by the Conseruator of Health, of the City, that hee should keepe a distance.* Wee bowed our selues towards him, and answered; *Wee were his humble Seruants; And accounted for great Honour, and singular Humanity towards vs, that which was already done; But hoped well, that the Nature, of the Sicknesse, of our Men, was not infectious.* So he returned; And a while after came the Notary to vs aboard our Ship; Holding in his hand a Fruit of that Country, like an Orenge, but of colour betweene Orenge-tawney and Scarlet; which cast a most excellent Odour. He vsed it (as it seemeth) for a Preseruatiue against Infection. He gaue vs our Oath; *By the Name of Iesus, and his Merits:* And after told vs, that the next day by six of the Clocke in the Morning, we should bee sent to, and brought to the *Strangers House*, (so hee called it,) where we should be accomodated of things, both for our whole, and for our Sicke. So he left vs; And when we offered him some Pistolets, he smiling, said; *Hee must not bee twice paid for one Labour:* Meaning (as I take it) that he had Salary sufficient of the State for his Seruice. For (as I after learned) they call an Officer that taketh Rewards, *Twice-paid*.

The next Morning early, there came to vs the same Officer, that came to vs at first with his Cane, and told vs; *Hee came to conduct vs to the Strangers House; And that he had preuented the Houre, because we might haue the whole day before vs, for our Businessse.* For (said he) *If you will follow my Advice, there shall first*

goe with me some few of you, & see the place, and how it may be made
 conuenient for you; And then you may send for your Sick, and the rest
 of your Number; which yee will bring on Land. Wee thanked him,
 and said; That this Care, which he tooke of desolate Strangers, GOD
 would rewarde. And so sixe of vs went on Land with him:
 And when wee were on Land, hee went before vs, and turned
 to vs, and said; *Hee was but our Seruant, and our Guide.* Hee led
 vs through three faire Streets; And all the Way we went, there
 were gathered some People on both sides, standing in a Row;
 But in so ciuill a fashon, as if it had beene, not to wonder at
 vs, but to welcome vs: And diuers of them, as wee passed by
 them, put their Armes a little abroad; which is their Gesture,
 when they bid any welcome. The *Strangers House* is a faire
 and spacious Houe, built of Brick, of somewhat a blewer
 Colour than our Brick, And with handsome Windowes,
 some of Glasse, some of a kinde of Cambrick oyl'd. Hee
 brought vs first into a faire Parlour aboue staires, and then
 asked vs; *What number of Persons we were? And how many sick?*
 we answered, *Wee were in all, (sick and whole) one and fifty Per-
 sons, whereof our sick were seuateene.* Hee desired vs to haue pa-
 tience a little, and to stay till he came backe to vs; which was
 about an Houre after; And then hee led vs to see the Cham-
 bers, whch were provided for vs, being in number nineteene.
 They hauing cast it (as it seemeth) that foure of those Cham-
 bers, which were better then the rest, might receiue foure of
 the principall Men of our Company; And lodge them alone
 by themselues; And the other 15. Chambers were to lodge
 vs, two and two together. The Chambers were handsome
 and chearefull Chambers, and furnished ciuilly. Then hee
 led vs to a long Gallery, like a Dorture, where hee shewed
 vs all along the one side (for the other side was but wall and
 window,) seuateene Cells, very neat ones, hauing partitions
 of Cedar wood. Which Gallery, and Cells, being in all for-
 ty, (many more then we needed,) were instituted as an Infir-
 mary for sick Persons. And hee told vs withall, that as any of
 our Sick waxed well, hee might be remoued from his Cell, to
 a Chamber: For which purpose, there were set forth ten

spare Chambers, besides the Number wee spake of before. This done, hee brought vs backe to the Parlour, and lifting vp his Cane a little, (as they doe when they giue any Charge or Command) said to vs; *Yee are to know that the Custome of the Land requireth, that after this day, and to morrow, (which we giue you for remouing of your people from your Shipp,) you are to keepe within doores for three dayes. But let it not trouble you, nor doe not thinke your selues restrained, but rather left to your Rest and Ease. You shall want nothing, and there are six of our People appointed to attend you, for any Businesse you may haue abroad.* We gaue him thanks, with all Affection and Respect, and said; *God surely is manifested in this Land.* Wee offered him also twenty Pistols; But he smiled, and onely said; *What? Twice paid!* And so hee left vs. Soone after our Dinner was serued in; Which was right good Viands, both for Bread, and Meat: Better than any Collegiate Diet, that I haue knowne in Europe. Wee had also Drinke of three sorts, all wholesome and good; Wine of the Grape; A Drinke of Graine, such as is with vs our Ale, but more cleare: And a kinde of Sider made of a fruit of that Countrey; A wonderfull pleasing and Refreshing Drinke. Besides, there were brought in to vs, great store of those Scarlet Orenge, for our Sicke; which (they said) were an assured Remedy for sicknesse taken at Sea. There was giuen vs also, a Box of small gray, or whitish Pills, which they wished our Sicke should take, one of the Pills euery night before sleepe; which (they said) would hasten their Recouery. The next day, after that our Trouble of Carriage, and Remouing of our Men, and Goods out of our Shipp, was somewhat serled and quiet, I thought good to call our Company together; and when they were assembled, said vnto them; *My deare Friends; Let vs know our selues, and how it standeth with vs. We are Men cast on Land, as Ionas was, out of the Whales Belly, when wee were as buried in the Deepe: And now wee are on Land, wee are but betweene Death and Life; For we are beyond, both the Old World and the New; And whether euer wee shall see Europe, God onely knoweth. It is a kinde of Miracle hath brought vs hither: And it must bee little lesse, that shall bring vs hence. Therefore in regard of our Deliuerance past, and*

our

our danger present, and to come, let vs looke vp to GOD, and euery man reforme his owne wayes. Besides we are come here amongst a Chrillian People, full of Piety and Humanity: Let vs not bring that Confusion of face vpon our selues, as to shew our vices, or vnworthinesse before them: Yet there is more. For they haue by Commandement, (though in forme of Courtesie) Cloistred vs within these Walls for three dayes. Who knoweth, whether it be not, to take some tast of our manners and conditions? And if they finde them bad, to banish vs streight wayes; if good, to giue vs further time. For these Men, that they haue giuen vs for Attendance, may withall haue an eye vpon vs. Therefore for GODS loue, and as we loue the weale of our Soules and Bodies, let vs so behaue our selues, as we may be at peace with GOD, and may finde grace in the Eyes of this People. Our Company with one voice thanked me for my good Admonition, and promised me to liue soberly and ciuilly, and without giuing any the least occasion of Offence. So we spent our three dayes ioyfully, and without care, in expectation what would be done with vs, when they were expired. During which time, wee had euery houre ioy of the Amendment of our Sick; who thought themselues cast into some Diuine Poole of Healing; They mended so kindly, and so fast.

The Morow after our three dayes were past, there came to vs a new Man, that we had not seene before, clothed in Blew as the former was, saue that his Turban was white with a small red Crosse on the Topp. He had also a Tipper of fine Linnen. At his Comming in, he did bend to vs a little, and put his Armes abroad. Wee of our Parts saluted him in a very lowly and submissiue manner; As looking that from him, wee should receiue Sentence of Life, or Death. Hee desired to speake With some few of vs: Wherevpon six of vs onely stayed, and the rest auoyded the Roome. He said; I am by Office Gouernour of this House of Strangers, & by Vocation I am a Christian Priest; And therefore am come to you, to offer you my seruice, both as Strangers, and chiefly as Christians. Some things I may tell you, which I thinke you will not be vnwilling to heare. The State hath giuen you Licence to stay on Land for the space of six weekes. And let it not trouble you, if your occasions aske further time, for the Law in

this point is not precise; And I doe not doubt, but my selfe shall be able to obtaine for you, such further time, as may be conuenient. Ye shall also vnderstand, that the Strangers Houle, is at this time Rich, and much aforehand; For it hath laid vp Reuenew these 37. yeares: For so long it is, since any Stranger arriued in this part: And therefore take yee no care, The State will defray you all the time you stay: Neither shall you stay one day the lesse for that. As for any Merchandize ye haue brought, ye shall be well vsed, and haue your returne, either in Merchandize, or in Gold and Siluer: For to vs it is all one. And if you haue any other Request to make, hide it not. For yee shall finde, wee will not make your Countenance to fall, by the answer ye shall receiue. Onely this I must tell you, that none of you must goe aboue a Karan, (that is with them a Mile and an halfe) from the walles of the Citty, without especiall leaue. We answered, after we had looked a while vpon one another, admiring this gracious and parent like vsage; That wee could not tell what to say: For wee wanted words to expresse our Thanks; And his Noble free Offers left vs nothing to aske. It seemed to vs, that we had before vs a picture of our Saluation in Heauen: For we that were a while since in the lawes of Death, were now brought into a place, where we found nothing but Consolations. For the Commandement layd vpon vs, wee would not faile to obey it, though it was impossible, but our Hearts should be enflamed to tread further vpon this Happy and Holy Ground. Wee added; That our Tongues should first cleaue to the Roofes of our Monthes, ere we should forget, either his Reuerend Person, or this whole Nation, in our Prayers. Wee also most humbly besought him to accept of vs as his true seruants, by as iust a Right, as euer Men on Earth were bounden; laying and presenting, both our Persons, and all we had at his feete. Hee said; He was a Priest, and looked for a Priests reward; which was our Brotherly loue, and the Good of our Soules and Bodies. So he went from vs, not without teares of Tenderesse in his Eyes; And left vs also confused with ioy and kindnesse, saying amongst our selues; That wee were come into a Land of Angells, which did appeare to vs dayly, and preuent vs with Comforts, which we thought not of, much lesse expected.

The next day about 10. of the Clocke, the Gouvernour came

came to vs againe, and after Salutations, said familiarly; That he was come to visit vs, And called for a Chaire, and sat him downe; And wee being some 10. of vs (the rest were of the meaner sort, or else gone abroad;) sat downe with him, And When wee were sett, he began thus. Wee of this Island of Bensalem (for so they call it in their Language) haue this; That by meanes of our solitary Situation; and of the Lawes of Secrecy, which wee haue for our Trauellers and our rare Admission of Strangers; wee know well most part of the Habitable World, and are our selues unknowne Therefore because hee that knoweth least, is fittest to aske Questions, it is more Reason, for the Entertainment of the time, that yee aske me Questions, than that I aske you. Wee answered; That wee humbly thanked him, that he would giue vs leave so to doe: And that we conceiued by the taste wee had already, that there was no worldly thing on Earth, more worthy to be knowne, than the State of that happy Land. But aboue all (wee said) since that we were mett from the seuerall Ends of the world; and hoped assuredly, that wee should meet one day in the Kingdome of Heauen (for that wee were both Parts Christians) we desired to know (in respect that Land was so remote, and so diuided by vast and unknowne Seas, from the Land, wher our SAVIOUR walked on Earth) who was the Apostle of that Nation, and how it was conuerted to the faith? It appeared in his face, that he tooke great Contentment in this our Question: Hee said; Te knit my Heart to you, by asking this Question in the first place; For it sheweth that you First seek the Kingdome of Heauen; And I shall gladly, and briefly, satisfie your demand.

About twenty Teares after the Ascension of our SAVIOUR, it came to passe, that there was seene by the people of Rensusa, (a City vpon the Easterne Coast of our Island,) within Night, (the Night was Cloudy and Calme,) as it might be some mile into the Sea, a great Pillar of Light, Not sharp, but in forme of a Columne, or Cylinder, rising from the Sea, a great way vp towards Heauen; and on the topp of it was seene a large Crosse of Light, more bright and resplendent than the Body of the Pillar. Vpon which so strange a Spectacle, the People of the City gathered a pace together vpon the Sands, to wonder; And so after put themselues into a number of small Boats to goe

nearer to this Marueilous sight. But when the Boats were come within (about) 60. yards of the Pillar, they found themselves all bound, and could goe no further, yet so as they might moue to goe about, but might not aproach nearer: So as the Boats stood all as in a Theater, beholding this Light, as an Heauenly Signe. It so fell out, that there was in one of the Boates, one of the Wise Men, of the Society of Salomons House; which House or, Colledge (my good Brethren) is the very Eye of this Kingdome; Who hauing a while attentiuely and deuoutly viewed, and contemplated this Pillar, and Croſſe, fell downe vpon his face; And then raised himselfe vpon his knees, and lifting vp his Hands to Heauen, made his prayers in this manner.

Lord God of Heauen and Earth; thou hast vouchsafed of thy Grace, to those of our Order, to know thy Workes of Creation, and the Secrets of them; And to discern (as farre as appertaineth to the Generations of Men) betweene Diuine Miracles, Works of Nature, Works of Art, and Impostures, and Illusions of all sorts. I doe here acknowledge and testifie before this People, that the Thing which wee now see before our eyes, is thy Finger, and a true Miracle. And for-as-much, as we learne in our Bookes, that thou neuer Workest Miracles, but to a Diuine and Excellent End, (for the Lawes of Nature are thine owne Lawes, and thou exceedest them not but vpon great cause) wee most humbly beseech thee to prosper this great Signe, And to giue vs the Interpretation and use of it in Mercy; Which thou doest in some part secretly promise, by sending it vnto vs.

When hee made his Prayer, hee presently found the Boate hee was in, moueable & vnbound; where as all the rest remained still fast; And taking that for an asurance of Leauē to aproach, hee caused the

Boate

Boat to be softly, and with silence rowed towards the Pillar. But ere he came neere it, the Pillar and Crosse of Light brake up, and cast it selfe abroad, as it were, into a Firmament of many Starres; which also vanished soone after, and there was nothing left to be seen, but a small Arke, or Chest of Cedar, dry, and not wet at all with water, though it swam. And in the Fore-end of it, which was towards him, grew a small Greene Branch of Palme; And when the wise man had taken it with all reuerence, into his Boat, it opened of it selfe, and there were found in it, a Booke, and a Letter; Both written in fine Parchment, and wrapped in Sindons of Linnen. The Booke contained all the Canonickall Books of the Old and New Testament, according as you haue them; (For we know well what the Churches with you receiue;) And the Apocalypse it selfe; And some other Bookes of the New Testament, which were not at that time written, were neuerthelesse in the Booke. And for the Letter, it was in these words.

I Bartholomew, a Seruant of the Highest, and Apostle of IESVS CHRIST, was warned by an Angell that appeared to mee, in a vision of Glory, that I should commit this Arke to the flouds of the Sea, I therefore doe testifie and declare, vnto that People, where GOD shall ordaine this Arke to come to Land, that in the same day is come vnto them Saluation, and Peace, and Good Will, from the Father, and from the LORD IESVS:

There was also in both these writings, as well the Booke; as the Letter, wrought a great Miracle, Conforme to that of the Apostles, in the Originall Gift of Tongues. For there being at that time, in this Land, Hebrewes, Persians, and Indians, besides the Natiues, euery one read vpon the Book, and Letter, as if they had been written in his owne Language. And thus was this Land saued from infidelity, (as the Remaine of the Old World was from Water) by an Arke, through the Apostolicall and Miraculous Euangelisme of S. Bartholomew. And here hee paused, and a Messenger came,
and

and called him forth from vs. So this was all that passed in that Conference.

The next Day, the same Gouvernor came againe to vs, immediately after Dinner, and excused himselfe, saying; *That the Day before, he was called from vs, somewhat abruptly, but now he would make vs amends, and spend time with vs, if wee held his Company, and Conference agreeable.* Wee answered; *That wee held it so agreeable and pleasing to vs, as wee forgot both Dangers past and Feares to come, for the time wee heard him speake; And that wee thought an Houre spent with him, was worth Teares of our former life.* He bowed himselfe a litle to vs, and after we were set againe hee said; *Well, the Questions are on your part.* One of our Number said after a litle Pause; *That there was a Matter, wee were no lesse desirous to know, than fearefull to aske, least wee might presume too farre. But encouraged by his rare Humanity towards vs, (that could scarce thinke our selues Strangers, being his vowed and professed Seruants,) wee would take the Hardines to propound it: Humbly beseeching him, if hee thought it not fit to be answered, that hee would pardon it, though hee reiected it.* We said, *We well obserued those his words, which he formerly spake, that this happy Island, where wee now stood, was knowne to few, and yet knew most of the Nations of the World; which we found to be true, considering they had the Languages of Europe, and knew much of our State and Bu-
sines; And yet we in Europe (not withstanding all the remote Disco-
ueries, and Nauigations of this last Age) neuer heard any of the least
Inkling or Glimse of this Island. This wee found wonderfull strange;
For that all Nations haue Enterknowledge one of another, either by
Voyage into Forreine Parts, or by Strangers that come to them: And
though the Traueller into a Forreine Countrey, doth commonly know
more by the Eye, than he that stayeth at home can by relation of the
Traueller; Yet both wayes suffice to make a mutuall Knowledge, in
some degree, on both parts. But for this Island, wee neuer heard tell
of any Shipp of theirs, that had been seene to arriue vpon any shore of
Europe; No, nor of either the East or West Indies, nor yet of any
Shipp of any other part of the World, that had made returne from
them. And yet the Maruell rested not in this. For the Situation of it
(as his Lordship said,) in the secret Conclauce of such a vast Sea
mought*

mought cause it. But then, that they should haue Knowledge of the Languages, Bookes, Affaires, of those that lye such a distance from them, it was a thing wee could not tell what to make of; For that it seemed to vs a condition and Propriety of Diuine Powers and Beings, to bee hidden and vnseene to others, and yet to haue others open, and as in a light to them. At this speech the Gouvernour gaue a gracious smile and said; That wee did well to aske pardon for this Question wee now asked; For it imported, as if wee thought this Land, a Land of Magicians, that sent forth Spirits of the Ayre into all parts, to bring them Newes, and Intilligence of other Countries. It was answered by vs all, in all possible humblenes, but yet with a Countenance taking knowledge, that wee knew that he spake it but merrily; That wee were apt enough to thinke, there was somewhat supernaturall in this Island; but yet rather as Angelicall than Magicall. But to let his Lordship knowe truly, what it was, that made vs tender and doubtfull to aske this Question, it was not any such conceit, but because we remembred, hee had giuen a Touch in his former Speech, that this Land had Lawes of Secrecy touching Strangers. To this he said, You remember it aright: And therefore in that I shall say to you, I must reserue some particulars, which it is not lawfull for me to reueale; but there will be enough left, to giue you satisfaction.

You shall vnderstand (that which perhaps you will scarce thinke credible) that about three thousand Teares agoe, or somewhat more, the Nauigation of the World (specially for remote Voyages) was greater than at this Day. Doe not thinke with your selues, that I know not how much it is encreased with you, within these threescore Teares: I know it well; And yet I say, greater then, than now: Whether it was, that the Example of the Ark, that saued the Remnant of Men, from the vniuersall Deluge, gaue Men confidence to aduenture vpon the Waters; Or what it was; but such is the truth. The Phœnicæans, and specially the Tyrians, had great Fleets. So had the Carthaginians their Colony, which is yet further West. Toward the East the Shipping of Egypt, and of Palestina was likewise great. China also, and the great Atlantis, (that you call America) which haue now but Iunks, and Canoa's, abounded then in tall Ships. This Island, (as appeareth by faithfull Registers of those times) had then fiftene

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hundred strong Ships, of great content. Of all this, there is with you sparing Memory, or none; But wee haue large Knowledge thereof.

At that time, this Land was knowne and frequented by the Ships and Vessells of all the Nations before named. And (as it commeth to passe) they had many times Men of other Countries, that were no Saylers, that came with them; As Persians, Chaldeans, Arabians; So as almost all Nations of Might and Fame resorted hither; Of whom, we haue some Stirps, and little Tribes with vs; at this day. And for our owne Ships, they went sundry Voyages, as well to your Streights, which you call the Pillars of Hercules, As to other parts in the Atlantique and Mediterrane Seas; As to Paguin, (which is the same with Cambalaine) and Quinzy, vpon the Orientall Seas, as farre as to the Borders of the East Tartary.

At the same time, and an Age after, or more, the Inhabitants of the great Atlantis did flourish. For though the Narration and Description which is made by a great Man with you, that the Descendents of Neptune planted there; and of the Magnificent Temple, Pallace, City, and Hill; and the manifold streames of goodly Nauigable Rivers, (which as so many Chaines enuironed the same Site, and Temple; And the seuerall Degrees of Ascent, whereby Men did climb vp to the same, as if it had bin a Scala Cæli; be all Poeticall and Fabulous: Yet so much is true, that the said Countrey of Atlantis; As well that of Peru then called Coya; as that of Mexico then named Tyrambel, were mighty and proud Kingdomes, in Armes, Shipping, and Riches: So mighty, as at one time, (or at least within the space of 10. Yeares,) they both made two great Expeditions; They of Tirambel thorow the Atlantique to the Mediterrane Sea; and they of Coya thorow the South Sea vpon this our Island: And for the former of these, which was into Europe, the same Authour amongst you, (as it seemeth,) had some relation from the Egyptian Prielt, whom he citeth. For assuredly such a thing there was. But whether it were the Ancient Athenians, that had the glory of the Repulse, and Resistance of those Forces, I can say nothing: But certaine it is there neuer came backe, either Ship, or Man, from that Voyage. Neither had the other Voyage of those of Coya vpon vs, had better fortune if they had not met with Enemies of greater clemency. For the King of this Island, (by name Altabin,) a wise Man, and a great Warrior,

Warrier; Knowing well both his owne strength, and that of his Enemies; handled the matter so, as hee cut off their Land-Forces, from their Ships; and entoyled both their Navy, and their Campe, with a greater Power than theirs, both by Sea & Land: And compelled them to render themselves without striking stroke. And after they were at his Mercy, contenting himselfe only with their Oath, that they should no more beare Armes against him, dismissed them all in safety. But the Diuine Reuenge ouertooke not long after those proud Enterprises. For within lesse than the space of one Hundred Yeares, the Great Atlantis was utterly lost and destroyed: Not by a great Earthquake, as your Man saith; (For that whole Tract is little subject to Earthquakes;) But by a particular Deluge or Inundation; Those Countries hauing, at this Day, farre greater Riuer, and farre higher Mountaines to powre downe waters, than any part of the Old World. But it is true, that the same Inundation was not deepe; Not past forty foot, in most places, from the Ground; So that although it destroyed Man and Beast generally, yet some few wild Inhabitants of the Wood escaped. Birds also were saved by flying to the high Trees & Woods. For as for Men, although they had Buildings in many places, higher than the Depth of the Water; Yet that Inundation, though it were shallow, had a long Continuance; whereby they of the Vale, that were not drowned, perished for want of Food, and other things necessary. So as maruaile you not at the thin Population of America, nor at the Rudenesse and Ignorance of the People; For you must account your Inhabitants of America as a young People; Younger a thousand years, at the least, than the rest of the World. For that there was so much time, betweene the Vniuersall Floud, and their Particular Inundation. For the poore Remnant of Humane Seed, which remained in their Mountaines, Peopled the Country againe slowly, by little and little; And being simple and sauage People, (Not like Noah and his Sonnes, which was the chiefe Family of the Earth) they were not able to leaue Letters, Arts, and Ciuility, to their Posterity; And hauing likewise in their Montanous Habitations beene used, (in respect of the extreme Cold of those Regions,) to cloath themselves with the Skinnes of Tygers, Beares, and great Hairy Goats, that they haue in those Parts; When after they came downe into the Valley, and found the

Intolerable Heats which are there, and knew no meanes of lighter Apparell : They were forced to begin the Custome of Going Naked, which continueth at this Day. Onely they take great pride and delight, in the Feathers of Birds ; And this also they tooke from those their Auncestors of the Mountaines, who were invited vnto it, by the infinite Flights of Birds, that came vvp to the high Grounds, while the Waters stood below. So you see, by this maine Accident of Time, wee lost our Trafficke with the Americans, with whom, of all others, in regard they lay nearest to vs, we had most Commerce. As for the other Parts of the World, it is most manifest, that in the Ages following, (whether it were in respect of Warres, or by a naturall Revolution of Time,) Nauigation did euery where greatly decay ; And specially farre Voyages, (the rather by the vse of Galies, and such Vessels as could hardly brooke the Ocean,) were altogether left and omitted. So then, that part of Entercourse, which could bee from other Nations, to Sayle to vs, you see how it hath long since ceased ; Except it were by some rare Accident, as this of yours. But now of the Cessation of that other Part of Entercourse, which mought be by our Sayling to other Nations, I must yeeld you some other Cause. For I cannot say, (if I shall say truly,) but our Shipping, for Number, Strength, Marriners, Pylots, and all things that appertaine to Nauigation, is as great as euer ; And therefore why we should sit at home, I shall now giue you an account by it selfe ; And it will draw nearer, to giue you satisfaction, to your principall Question.

There reigned in this Island, about 1900. yeares agoe, a King, whose memory of all others wee most adore ; Not Superstitiously, but as a Diuine Instrument, though a Mortall Man : His Name was Solamona : And wee esteeme him as the Law-giuer of our Nation. This King had a large Heart, inscrutable for good ; And was wholly bent to make his Kingdome and People Happy. Hee therefore taking into Consideration, how sufficient and substantiue this Land was, to maintaine it selfe without any aid (at all) of the Forrainer ; Being 5600. Miles in circuit, and of rare Fertility of Soyle, in the greatest Part thereof ; And finding also the Shipping of this Countrey mought bee plentifully set on worke, both by Fishing, and by Transportations from Port to Port, and likewise by Sayling

unto some small Islands that are not farre from vs, and are vnder the Crowne and Lawes of this State; And recalling into his Memory, the happy and flourishing Estate, wherein this Land then was; So as it mought bee a thousand wayes altered to the worse, but scarce any one way to the better; thought nothing wanted to his Noble and Heroicall Intentions, but onely (as farre as Humane fore-sight mought reach) to giue perpetuity to that, which was in his time so happily established. Therefore amongst his other Fundamentall Lawes of this Kingdome, he did ordaine the Interdicts and Prohibitions, which wee haue touching Entrance of Strangers; which at that time (though it was after the Calamity of America) was frequent; Doubting Nouelties, and Commixture of Manners. It is true, the like Law, against the Admission of Strangers without License, is an Ancient Law, in the Kingdome of China, and yet continued in use. But there it is a poore Thing; And hath made them a curious, ignorant, fearefull, foolish Nation. But our Law-giuer made his Law of another temper. For first, hee hath preserued all points of Humanity, in taking Order, and making Prouision for the Releefe of Strangers distressed; whereof you haue tasted. At which Speech (as reason was) wee all rose vp, and bowed our selues. Hee went on. That King also still desiring to ioyne Humanity and Policy together; And thinking it against Humanity, to detaine Strangers here against their wills; And against Policy, that they should returne, and discouer their Knowledge of this Estate, hee tooke this Course: He did ordaine, that of the Strangers that should bee permitted to Land, as many (at all times) mought depart as would; But as many as would stay, should haue very good Conditions, and Meanes to liue, from the State. Wherein hee saw so farre, that now in so many Ages since the Prohibition, we haue memory not of one Ship that euer returned, and but of thirteene Persons onely, at severall times, that chose to returne in our Bottomes. What those few that returned may haue reported abroad I know not. But you must thinke, Whatsoever they haue said, could bee taken where they came, but for a Dreame. Now for our Trauelling from hence into Parts abroad, our Law-Giuer thought fit altogether to restraine it. So is it not in China. For the Chineses sayle where they will, or can; which sheweth, that
their

their Law of keeping out Strangers, is a Law of Pusillanimity, and feare. But this restraint of ours, hath one onely Exception, which is admirable ; Preseruing the good which commeth by communicating with Strangers, and auoyding the Hurt ; And I will now open it to you. And here I shall seeme a little to digresse, but you will by and by finde it pertinent. Yee shall vnderstand, (my deare Friends,) that amongst the Excellent Acts of that King, one aboue all hath the preheminance. It was the Erection, and Institution of an Order, or Society, which wee call Salomons House ; The Noblest Foundation, (as we thinke,) that euer was vpon the Earth ; And the Lanthorn of this Kingdome. It is dedicated to the Study of the Workes, and Creatures of GOD. Some thinke it beareth the Founders Name a little corrupted, as if it should bee Solamona's House. But the Records write it, as it is spoken. So as I take it to bee denominate of the King of the Hebrewes, which is famous with you, and no Stranger to vs. For wee haue some Parts of his Workes, which with you are lost ; Namely that Naturall History, which he wrote of all Plants, from the Cedar of Libanus, to the Mosse that groweth out of the Wall ; And of all things that haue Life and Motion. This maketh me thinke, that our King finding himselfe to Symbolize in many things, with that King of the Hebrewes (which liued many years before him) honoured him with the Title of this Foundation. And I am the rather induced to bee of this Opinion, for that I finde in Ancient Records, this Order or Society is sometimes called Salomons House ; And sometimes the College of the Six Dayes Workes : Whereby I am satisfied, That our Excellent King had learned from the Hebrewes ; That GOD had created the World, and all that therein is, within six Daies ; And therefore hee instituting that Houle, for the finding out of the true Nature of all things, (whereby GOD might haue the more Glorie in the Workemanship of them, and Men the more fruit in the vse of them,) did giue it also that second Name. But now to come to our present purpose. When the King had forbidden to all his People, Nauigation into any Part, that was not vnder his Crowne, hee made neuerthelesse this Ordinance ; That euery twelue yeares there should bee set forth, out of this Kingdome, two Ships, appointed to seuerall Voyages ; That in either of these
Ships,

Ships, there should be a Mission of three of the Fellowes, or Brethren of Salomons House; whose Errand was only to give vs Knowledge of the Affaires and State of those Countries, to which they were designed; And especially of the Sciences, Arts, Manufactures, and Inventions of all the World; And withall to bring vnto vs, Bookes, Instruments, and Patterns, in euery kinde: That the Ships, after they had landed the Brethren, should returne; and that the Brethren should stay abroad till the new Mission: These Ships are not otherwise fraught, than with Store of Victualls, and good Quantity of Treasure to remaine with the Brethren, for the buying of such Things, and rewarding of such Persons, as they should thinke fit. Now for me to tell you, how the Vulgar sort of Mariners are contained from being discovered at Land; And how they that must be put on shore for any time, colour themselves vnder the Names of other Nations, And to what places these Voyages haue beene designed; And what places of Rendez-Vous are appointed for the new Missions, And the like Circumstances of the Practique, I may not doe it; Neither is it much to your desire. But thus you see, wee maintaine a Trade, not for Gold, Siluer, or Iewels; Nor for Silkes; Nor for Spices; Nor any other Commodity of Matter; But onely for GODS first Creature, which was Light: To haue Light (I say) of the Growth of all Parts of the World. And when hee had said this, hee was silent; And so were wee all. For indeed wee were all astonished, to heare so strange things so probably told. And hee perceiuing, that wee were willing to say somewhat, but had it not ready, in great Courtesie tooke vs off, and descended to aske vs Questions of our Voyage and Fortunes, and in the end concluded, that wee mought doe well, to thinke with our selues, what time of stay wee would demand of the State; And bad vs not to scant our selues; For hee would procure such time as wee desired. Wherevpon wee all rose vp, and presented our selues to kisse the skirt of his Tipper, But hee would not suffer vs; and so tooke his leaue. But when it came once amongst our People, that the State vsed to offer Conditions to Strangers, that would stay, wee had Worke enough to get any of our Men to looke to our Ship; And

to keepe them from going presently to the Gouvernour, to craue Conditions. But with much adoe wee refrained them, till wee mought agree what course to take.

We tooke our selues now for free men, seeing there was no danger of our viter Perdition, And liued most ioyfully, going abroad, and seeing what was to bee seen, in the Citty and places adiacent, within our Tedder; And obtaining Acquaintance with many of the Citty, not of the meanest Quallity; At whose hands wee found such Humanity, and such a freedom and desire, to take Strangers, as it were, into their Bosome, as was enough to make vs forget all that was deare to vs, in our owne Countries: And continually wee met with many things, right worthy of Obseruation, and Relation: As indeed, if there bee a Mirrour in the World, worthy to hold Mens Eyes, it is that Country. One day there were two of our Company bidden to a *Feast* of the *Family*, as they call it. A most Naturall, Pious, and Reuerend Custome it is, shewing that Nation to bee compounded of all Goodnes. This is the manner of it. It is granted to any Man, that shall liue to see thirty Persons, descended of his Body, aliue together, and all about 3. yeares old, to make this *Feast*, which is done at the Cost of the State. The *Father* of the *Family*, whom they call the *Tirfan*, two days before the *Feast*, taketh to him three of such Friends as he liketh to chuse; And is assisted also by the Gouvernour of the City, or Place, where the *Feast* is celebrated; And all the *Persons* of the *Family*, of both Sexes, are summoned to attend him. These two dayes the *Tirfan* sitteth in Consultation, concerning the good Estate of the *Family*. There, if there be any Discord or Sutes betweene any of the *Family*, they are compounded and appeased. There, if any of the *Family* bee Distressed or Decayed, order is taken for their Reliefe, and competent meanes to liue. There if any bee subiect to vice or take ill Courses, they are reprovued and Censured. So likewise, Direction is giuen touching Marriages, and the courses of life, which any of them should take, with diuers other the like Orders and Aduises. The Gouvernour assisteth, to the end, to put in Execution, by his Publike

Publike Authority, the Decrees and Orders of the *Tirfan*, if they should bee disobeyed ; Though that seldome needeth ; Such Reuerence and Obedience they giue, to the Order of Nature. The *Tirfan* doth also then, euer chuse one Man from amongst his Sonnes, to liue in House with him : Who is called, euer after, the *Sonne of the Vine*. The Reason will hereafter appeare. On the *Feast* day, the *Father* or *Tirfan* commeth foorth after Diuine Seruice, into a large Roome, where the *Feast* is celebrated, Which Roome hath an Halfe-Pace at the vpper end. Against the wall, in the middle of the halfe-pace, is a Chaire placed for him, with a Table and Carpet before it. Ouer the Chaire is a State, made Round or Ouall, and It is of Iuy ; An Iuy somewhat whiter than ours, like the Lease of a Siluer Aspe, but more shining ; For it is Greene all winter. And the State is curiously wrought with Siluer and Silke of diuers Colours, broyding or binding in the Iuy ; And is euer of the worke, of some of the Daughters of the Family ; And vailed ouer at the top, with a fine Net of Silke and Siluer. But the Substance of it is true Iuy ; whereof, after it is taken downe, the Friends of the Family, are desirous to haue some Lease or Sprig to keepe. The *Tirfan* commeth forth with all his Generation or Linage, the Males before him, and the Females following him ; And if there be a Mother, from whose Body the Whole Linage is descended, there is a Trauerse placed in a Loft aboue on the right hand of the Chaire, with a priuy Dore, and a carued Window of Glasse, leaded with Gold and blew ; Where she sitteth, but is not seene. When the *Tirfan* is come foorth, hee sitteth downe in the Chaire ; And all the Linage place themselves against the wall, both at his backe, and vpon the Returne of the Halfe-pace, in Order of their yeares, without difference of Sex, and stand vpon their Feet. When hee is set, the Roome being alwaies full of Company ; but well kept and without Disorder, after some pause, there commeth in from the lower end of the Roome, a *Taratan*, (which is as much as an *Herald* ;)

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And

And on either side of him two *yong Lads* ; Whereof one carrieth a *Scrowle* of their shining yellow *Parchment* ; And the other a cluster of *Grapes* of Gold, with a long *Foot* or *Stalke*. The *Herald*, and *Children*, are clothed with *Mantles* of *Sea-water greene Sattin* ; But the *Heralds* *Mantle* is *streamed* with Gold, and hath a *Traine*. Then the *Herald* with three *Curtesies*, or rather *Inclinations*, commeth vp as farre as the *Halfe-pace* ; And there first taketh into his *Hand* the *Scrowle*. This *Scrowle* is the *Kings Charter*, containing *Gift* of *Reuencue*, and many *Priuiliges*, *Exemptions*, and *Points* of *Honour*, granted to the *Father* of the *Family* ; And it is euer stiled and directed ; *To such an one ; Our welbeloued Friend and Creditour* : Which is a *Title* proper onely to this *Cafe*. For they say, the *King* is *Debter* to no *Man*, but for *Propagation* of his *Subiects*, The *Scale* set to the *Kings Charter*, is the *Kings Image*, *Imbossed* or *moulded* in *Gold* ; And though such *Charters* bee expedited of *Course*, and as of *Right*, yet they are varied by *discretion*, according to the *Number* and *Dignitie* of the *Family*. This *Charter* the *Herald* readeth aloud ; And while it is read, the *Father* or *Tirfan*, standeth vp, supported by two of his *Sonnes*, such as hee chooseth. Then the *Herald* mounteth the *half-Pace*, and deliuereth the *Charter* into his *Hand* : And with that there is an *Acclamation*, by all that are present, in their *Language*, which is thus much, *Happy are the People of Bensalem*. Then the *Herald* taketh into his *Hand* from the other *Child*, the *Cluster* of *Grapes*, which is of *Gold* ; Both the *Stalke*, and the *Grapes*. But the *Grapes* are daintily *enamelled* ; And if the *Males* of the *Family* bee the greater number, the *Grapes* are *enamelled* *Purple*, with a little *Sunne* set on the *Top* ; If the *Females*, then they are *enamelled* into a *greenish yellow*, with a *Crescent* on the *Top*. The *Grapes* are in number as many as there are *Descendants* of the *Family*. This *Golden Cluster*, the *Herald* deliuereth also to the *Tirfan* ; who presently deliuereth it ouer, to that *Sonne*, that hee had formerly

merly chosen, to bee in House with him: Who beareth it before his *Father*, as an Ensigne of Honour, when hee goeth in publike euer after; And is thereupon called *the Sonne of the Vine*. After this Ceremony ended, the *Father* or *Tirfan* retireth, And after some time commeth forth againe to Dinner, where hee sitteth alone vnder the State, as before; And none of his Descendants sit with him, of what Degree or Dignitie soeuer, except hee hap to bee of *Salomons House*. Hee is serued onely by his owne Children, such as are Male; who performe vnto him all seruice of the Table vpon the knee; And the Women onely stand about him, leaning against the wall. The Roome belowe the Halfe-pace, hath Tables on the sides for the Guests that are bidden; Who are serued with great and comely order; And towards the end of Dinner (which in the greatest Feasts with them, lasteth neuer aboute an Houre and a halfe) there is an *Hymne* sung, varied according to the Inuention of him that compolet it; (for they haue excellent Poetrie,) But the Subiect of it is (alwayes) the prayles of *Adam*, and *Noah*, and *Abraham*; Whereof the former two Peopled the World, and the last was the *Father* of the *Faithfull*: Concluding euer with a Thanksgiuing for the *Natiuitie* of our *Sauour*, in whose Birth, the Births of all are onely Blessed. Dinner being done, the *Tirfan* retireth againe; And hauing withdrawne himselfe alone into a place; where he maketh some priuate Prayers, hee commeth forth the third time, to giue the Blessing; with all his Descendants, who stand about him as at the first. Then hee calleth them forth by one and by one, by name, as hee pleaseth, though seldome the Order of Age bee inuerted. The person that is called, (the Table being before remoued), kneeleth downe before the Chaire, and the *Father* layeth his Hand, vpon his Head, or her Head, and giueth the Blessing in these words: *Sonne of Bensalem*, (or *Daughter of Bensalem*,) *thy Father saith it; The Man by whom thou hast Breath and Life speaketh the word; The Blessing of the Euerlasting Father;*

the Prince of Peace, and the Holy Dove bee upon thee, and make the dayes of thy Pilgrimage good and many. This hee saith to euery of them ; And that done, if there bee any of his Sonnes; of eminent Merrit and Vertue, (so they bee not aboute two,) hee calleth for them againe ; And saith, laying his Arme ouer their shoulders, they standing ; Sonnes, it is well you are borne, giue God the praise, and perseuere to the end. And withall deliuereth to either of them a Iewell, made in the Figure of an Eare of Wheat, which they euer after weare in the front of their Turban, or Hatt, This done, they fall to Musicke and dances, And other Recreations, after their manner, for the rest of the day. This is the full order of that Feast.

By that time, six or seuen Dayes were spent, I was fallen into straight Acquaintance, with a Merchant of that Citty, whose Name was *Ioabin*. Hee was a Jew and Circumcised : For they haue some few Stirps of Jewes, yet remaining among them, whom they leaue to their owne Religion. Which they may the better doe, because they are of a farre differing Disposition from the Jewes in other Parts. For whereas they hate the name of CHRIST ; And haue a secret inbred Rancour against the People amongst whom they liue ; These (contrariwise) giue vnto our SAVIOUR many high Attributes, and loue the Nation of *Bensalem*, extremely. Surely this Man, of whom I speake, would euer acknowledge, that CHRIST was borne of a Virgin ; And that hee was more than a Man ; And he would tell how GOD made him Ruler of the Seraphims, which guard his Throane ; And they call him also the *Milken Way*, and the *Eliab* of the *Messiah* ; And many other High Names ; which though they bee Inferiour to his Diuine Maiesty, Yet they are farre from the Language of other Jewes. And for the Countrey of *Bensalem*, this Man would make no end of commending it ; Being desirous by Tradition among the Jewes there, to haue it beleeued, that the People thereof were of the Generations of *Abraham*, by another Sonne, whom they call *Nachoran*, And that

that *Moses* by a secret *Cabala* ordained the Lawes of *Bensalem* which they now vse ; And that when the *Messiah* should come, and sit in his Throne at *Hierusalem*, the King of *Bensalem*, should sit at his feet, whereas other Kings should keepe a great distance. But yet setting aside these *Iewish* Dreames, the Man was a wise Man, and learned, and of great Pollicy, and excellently scene in the Lawes and Customes of that Nation. Amongst other Discourses, one day, I told him, I was much affected with the Relation I had, from some of the Company, of their Custome, in holding the *Feast of the Family* ; For that (methought) I had neuer heard of a Solemnity, wherein Nature did so much preside. And because Propagation of Families, proceedeth from the Nuptiall Copulation, I desired to know of him, what Lawes and Customes they had concerning Marriage ; And whether they kept Marriage well ; And whether they were tyed to one Wife ? For that where Population is so much affected, and such as with them it seemed to bee, there is commonly Permission of *Plurality of Wiues*. To this hee said ; You haue Reason for to commend that excellent Institution of the *Feast of the Family*, And indeed wee haue Experience, that those Families, that are partakers of the Blessing of that *Feast*, doe flourish and prosper euer after, in an extraordinary manner. But heare mee now and I will tell you what I know. You shall vnderstand, that there is not vnder the Heauens, so chaste a Nation, as this of *Bensalem* ; Nor so free from all Pollution or foulennesse. It is the *Virgin of the World*. I remember, I haue read in one of your *Europæan* Bookes, of an holy *Hermit* amongst you, that desired to see the Spirit of Fornication, and there appeared to him, a little foule ugly *Aethiope* : But if hee had desired to see the Spirit of Chastitie of *Bensalem*, it would haue appeared to him, in the likeness of a faire beautifull *Cherubine*. For there is nothing, amongst Mortall Men, more faire and admirable, than the Chast Mindes of this People. Knowe therefore, that with them there are no Stewes, no dissolute Houses, no Curtisans, nor any thing of that kinde. Nay they wonder (with detestation) at you in Europe, which
permit

permit such things. They say ye haue put Marriage out of office:
 For Mariage is ordained a Remedy for vnlawfull Concupiscence;
 And Naturall Concupiscence seemeth as a spurr to Marriage. But
 when Men haue at hand a Remedy, more agreeable to their cor-
 rupt will, Marriage is almost expulsed. And therefore there are
 with you seene infinit Men, that marry not, but chuse rather a
 libertine and impure single Life, than to bee yoked in Marriage;
 And many that doe marry, marry late, when the Prime and
 Strength of their Yeares is past. And when they doe marry, what
 is Marriage to them, but a very Bargaine; Wherin is sought
 A'lance, or Portion, or Reputation, with some desire (almost in-
 different) of Issue; And not the faithfull Nuptiall Vnion of Man
 and Wife, that was first instituted. Neither is it possible, that
 those that haue cast away so basely, so much of their Sirength,
 should greatly esteeme Children, (being of the same Matter,) as
 Chaste Men doe. So likewise during Marriage is the Case much
 amended, as it ought to bee if those things were tolerated onely
 for necessitie; No, but they remaine still as a very Affront to
 Marriage. The Haunting of those dissolute places, or resort to
 Curtizans, are no more punished in Married Men, than in Bat-
 chellers. And the depraued Custome of change, and the Delight in
 Meretricious Embracements, (where sinne is turned into Art,)
 maketh Marriage a dull thing, and a kinde of Imposition, or Taxe.
 They heare you defend these things, as done to auoyd greater Euills;
 As Aduoutries, Deflouring of Virgins, Vnnaturall lust, and the
 like. But they say, this is a preposterous Wisdome; And they call it
 Lots offer, who to saue his Guests from abusing, Offered his
 Daughters: Nay they say further, That there is litle gained in this;
 For that the same Vices and Appetites, doe still remaine and a-
 bound; Vnlawfull Lust being like a Furnace, that if you stop
 the Flames altogether, it will quench; But if you giue it
 any vent, it will rage, As for Masculine Loue, they haue no
 touch of it; And yet there are not, so faithfull and inuiolate Friend-
 ships, in the world againe, as are there, And to speake gene-
 rally, (as I sayd before,) I haue not read of any such Chastity,
 in any People, as theirs. And their vsuall saying is, That who-
 soeuer is vnchaste can not reuerence himselfe: And they say,
 That

That the reuerence of a Mans selfe, is, next Religion, the chiefeft Bridle of all Vices. And when hee had said this, the good Iew pawfed a little; Whereupon, I far more willing to heare him speake on, than to speake my selfe; yet thinking it decent, that vpon his pawfe of Speech, I should not be altogether silent, said onely this; *That I would say to him, as the Widow of Sarepta said to Elias; that hee was come to bring to Memory our Sinnes; And that I confesse the Righteousnesse of Bensalem, was greater than the Righteousnesse of Europe,* At which speech hee bowed his Head, and went on this manner. *They haue also many wise and excellent Lawes touching Marriage. They allow no Polygamy. They haue ordained that none doe intermarry or contract, untill a Moneth bee past from their first Inter-view. Marriage without consent of Parents they doe not make voyd, but they mulct it in the Inheritors: For the Children of such Marriages, are not admitted to inherit, aboue a third Part of their Parents Inheritance. I haue read in a Booke of one of your Men, of a Feigned Common-wealth, where the Married couple are permitted, before they Contract, to see one another Naked. This they dislike: For they thinke it a Scorne, to giue a Refusall after so Familiar Knowledge: But because of many hidden Defects in Men and Womens Bodies, they haue a more Ciuill Way: For they haue neare euery Towne, a Couple of Pooles, (which they call Adam and Eues Pooles,) where it is permitted to one of the friends of the Man, and another of the friends of the Woman, to see them seuerally bath Naked.*

And as wee were thus in Conference, there came one that seemed to bee a Messenger, in a rich Huke, that spake with the Iew: whereupon hee turned to mee, and said; *You will pardon mee, for I am commanded away in haste. The next Morning hee came to mee againe, ioyfull as it seemed, and said; There is word come to the Gouvernour of the City, that one of the Fathers of Salomons House, will bee here this day Seuen-night: Wee haue seene none of them this Dozen Yeares. His Comming is in State; But the cause of his comming is secret. I will provide you, and your Fellowes, of a good*
Standing

Standing to see his Entry. I thanked him, and told him; I was most glad of the *Newes*. The day being come hee made his Entry. Hee was a *Man* of middle Stature, and Age, comely of Person, and had an Aspect as if hee pittied Men. Hee was cloathed in a Roabe of fine blacke Cloth, with wide Sleeues, and a Cape. His vnder Garment was of excellent white Linnen, downe to the Foot, girt with a Girdle of the same; And a Sindon or Tipper of the same about his Necke. Hee had Gloues, that were curious, and set with Stone; And Shoes of Peach-coloured Veluet. His Necke was bare to the Shoulders. His Hat was like a Helmet, or *Spanisb Montera*; And his Locks curled below it decently: They were of Colour browne. His Beard was cut round, and of the same colour with his Haire, somewhat lighter. Hee was carried in a rich Chariot, without wheelles, Litter-wise, With two Horses at either end, richly trapped in blew Veluet Embroydered; and two Footemen on each side in the like Attire. The Chariot was all of Cedar, gilt, and adorned with Chrystall; Saue that the For-end had Pannells of Sapphires, set in Borders of Gold; And the Hinder-end the like of Emerauds of the *Peru* Colour. There was also a Sunne of Gold, Radiant vpon the Top, in the Midst; And on the Top before, a small *Cherub* of Gold, with Wings displayed. The Chariot was couered with Cloth of Gold tissued vpon blew. Hee had before him fifty Attendants, yong Men all, in white *Satten* loose Coats to the Mid Legg, and Stockias of white Silk; And Shoes of blew Veluet; And Hats of blew Veluet; with fine Plumes of diuerse Colours, set round like Hat-bands. Next before the Chariot, went two Men, bare headed, in Linnen Garments downe to the Foot, girt, and Shoes of blew Veluet, Who carried the one a Crosier, the other a Pastorall Staffe like a Sheepe-hooke: Neither of them of Mettall, but the Crosier of Balme-wood, the Pastorall Staffe of Cedar. Horse-Men hee had none, neither before, nor behind his Chariot: As it seemeth to auoyd all Tumult and Trouble. Behinde his

his Chariot, went all the Officers and Principals of the Companies of the City. Hee sat alone, vpon Cushions, of a kinde of excellent Plush, blew ; And vnder his Foot curious Carpets of Silke of diuers Colours, like the Persian, but farre finer. Hee held vp his Bare Hand, as hee went, as blessing the People, but in Silence. The Street was wonderfully well kept ; So that there was neuer any Army had their Men stand in better Battell-Array, than the People stood. The Windowes likewise were not crouded, but euery one stood in them, as if they had beene placed. When the shew was past, the Iew said to mee ; *I shall not bee able to attend you as I would, in regard of some charge the City hath lay'd vpon mee, for the Entertaining of this Great Person.* Three dayes after the Iew came to mee againe, and said ; *Yee are happy Men, For the Father of Salomons House taketh knowledge of your Being here, and commanded mee to tell you, that hee will admit all your Company to his presence, and haue priuate Conference with one of you, that yee shall choose : And for this hath appointed the next day after to Morrow. And because hee meaneth to giue you his Blessing, hee hath appointed it in the Fore-Noone.* Wee came at our Day, and Houre, and I was chosen by my Fellowes for the priuate Access. Wee found him in a faire Chamber, richly hanged, and carpetted vnder Foote, without any Degrees to the State. Hee was set vpon a Low Throne richly adorned, and a rich Cloth of State ouer his Head, of Blew Sattin Embroidered. Hee was alone, saue that hee had two Pages of Honour, on either Hand one, finely attired in White. His Vnder Garments were the like that wee saw him weare in the Chariot ; But in stead of his Gowne, hee had on him a Mantle with a Cape, of the same fine Blacke, fastned about him. When wee came in, as we were taught, we bowed Low at our first Entrance ; And when wee were come neere his Chaire, hee stood vp, holding forth his Hand vngloved, and in Posture of Blessing ; And wee euery one of vs stooped downe, and kissed the Hemme of his Tippet. That done, the rest departed, and I remained.

Then he Warned the Pages forth of the Roome, and caused mee to sit downe beside him, and spake to me thus in the Spanish Tongue.

GOD blesse thee, my Sonne; I will giue thee the greatest Iewell I haue. For I will impart vnto thee, for the Loue of GOD and Men, a Relation of the true State of Salomons House. Sonne, to make you know the true state of Salomons House, I will keepe this order. First I will set forth vnto you the End of our Foundation. Secondly, the Preparations and Instruments wee haue for our Workes. Thirdly, the seuerall Employments and Functions whereto our Fellowes are assigned. And fourthly the Ordinances and Rites which wee obserue.

The End of our Foundation is the Knowledge of Causes, and Secret Motions of Things; and the Enlarging of the bounds of Humane Empire, to the Effecting of all Things possible.

The Preparations and Instruments are these. We haue large and deepe Caues of seuerall Depths: The deepest are sunke 600. Fathome: And some of them are digged and made vnder great Hills and Mountaines: So that if you reckon together the Depth of the Hill, and the Depth of the Caue, they are (some of them) aboue three Miles

Miles deepe. For wee finde, that the Depth of a Hill, and the Depth of a Caue from the Flat, is the same Thing; Both remote alike, from the Sunn and Heauens Beames, and from the open Ayre. These Caues wee call the Lower Region. And wee vse them for all Coagulations, Indurations, Retrigerations, and Conseruations, of Bodies. Wee vse them likewise for the Imitation of Naturall Mines; And the Producing also of New Artificiall Mettalls, by Compositions and Materialls which wee vse and lay there for many yeares. Wee vse them also sometimes, (which may seeme strange) for Curing of some Diseases, and for Prolongation of Life, in some Hermits that choose to liue there, well accommodated of all things necessarie, and indeed liue very long; By whom also wee learne many things.

Wee haue Burialls in seuerall Earths, where wee put diuers Cements, as the Chineses, doe their Porcellane. But wee haue them in greater Varietie, and some of them more fine. We also haue greate variety of Composts, and Soiles, for the Making of the Earth Fruitfull.

Wee haue High Towers; The Highest about halfe a Mile in Height; And some of them likewise set vpon High Mountaines: So that the Vantage of the Hill with the Tower, is in the highest of them three Miles at least. And these Places wee call the Vpper Region; Accounting the Aire betweene the High Places, and the

Lowe, as a Middle Region. Wee vse these Towers, according to their seuerall Heights, and Situations, for Insolation, Refrigeration, Conseruation, And for the View of diuers Meteors; As VVindes, Raine, Snow, Haile; And some of the Fiery Meteors also. And vpon them, in some Places, are Dwellings of Hermits, whom we visit sometimes, and instruct what to obserue.

Wee haue great Lakes both Salt, and Fresh, whereof wee haue vse for the Fish, and Fowle. We vse them also for Burialls of some Naturall Bodies: For wee finde a difference in Things buried in Earth, or in Aire below the Earth; and things buried in VWater. Wee haue also Pooles, of which some doe straine Fresh Water out of Salt; And others by Art doe turne Fresh Water into Salt. Wee haue also some Rocks in the Midst of the Sea; And some Bayes vpon the Shore for some VVorks, wherein is required the Aire and Vapour of the Sea. Wee haue likewise Violent Streames and Cataracts, which serue vs for many Motions: And likewise Engines for Multiplying and Enforcing of VVindes, to set also on going diuerse Motions.

Wee haue also a Number of Artificiall VVells, and Fountaines, made in Imitation of the Naturall Sources and Bathes; As tincted vpon Vitrioll, Sulphur, Steele, Brasse, Lead, Nitre, and other Mineralls: And againe wee haue little Well

Wells for Infusions of many Things, where the Waters take the Vertue quicker and better, than in Vessells, or Basins. And amongst them wee haue a Water, which wee call Water of Paradise, being, by that wee doe to it, made very Soueraigne for Health, and Prolongation of Life.

Wee haue also Great and spacious Houses, where wee imitate and demonstrate Meteors; As Snow, Haile, Raine, some Artificiall Raines of Bodies, and not of Water, Thunders, Lightnings; Also Generations of Bodies in Aire; As Frogs, Flies, and diuerse Others.

We haue also certaine Chambers, which we call Chambers of Health, where wee qualifie the Aire as wee thinke good and proper for the Cure of diuerse Diseases, and Preseruatiō of Health.

Wee haue also faire and large Baths, of seuerall Mixtures, for the Cure of Diseases, and the Restoring of Mans Body from Arefaction: And Others for the Confirming of it in Strength of Sinnewes, Vitall Parts, and the very Iuyce and Substance of the Body.

Wee haue also large and various Orchards, and Gardens; Wherein we doe not so much respect Beauty, as Variety of Ground and Soile, proper for diuerse Trees, and Herbs: And some very spacious, where Trees, and Berries are set, whereof wee make diuerse Kindes of Drinkes, besides the Vine-yards. In these wee practise likewise all Conclusions of Grafting, and Inoculating, as well of Wilde-Trees,

as Fruit-Trees, which produceth many Effects. And wee make (by Art) in the same Orchards, and Gardens, Trees and Flowers, to come earlier, or later than their Seasons; And to come vp and beare more speedily than by their Naturall Course they doe. Wee make them also by Art greater much than their Nature; And their Fruit greater, and sweeter, and of differing Taste, Smell, Colour, and Figure, from their Nature. And many of them wee so Order as they become of Medicinall Use.

Wee haue also Meanes to make diuerse Plants rise by Mixtures of Earthes without Seeds; And likewise to make diuerse New Plants, differing from the Vulgar; and to make one Tree or Plant turne into another.

Wee haue also Parkes, and Enclosures of all Sorts of Beasts, and Birds; which wee vse not onely for View or Rarenesse, but likewise for Dissections, and Trialls; That thereby wee may take light, what may bee wrought vpon the Body of Man. Wherein wee finde many strange Effects; As Continuing Life in them, though diuers Parts, which you account Vitall, bee perished, and taken forth; Resuscitating of some that seeme Dead in Appearance; And the like. Wee try also all Poysons, and other Medicines vpon them, as well of Chyrurgery, as Phisicke. By Art likewise, wee make them Greater, or Taller, than their Kinde is; And contrary-wise Dwarfe them and stay their Growth:

Wee

Wee make them more Fruitfull, and Bearing than their Kinde is; And contrary-wise Baren and not Generatiue. Also wee make them differ in Colour, Shape, Actiuity, many wayes. Wee finde Meanes to make Commixtures and Copulations of diuerse Kindes; which haue produced many New Kindes, and them not Barren, as the generall Opinion is. Wee make a Number of Kindes, of Serpents, Wormes, Flies, Fishes, of Putrefaction; whereof some are aduanced (in effect) to be Perfect Creatures, like Beasts, or Birds; And haue Sexes, and doe Propagate. Neither doe wee this by Chance, but wee know before hand, of what Matter and Commixture, what Kinde of those Creatures, will arise.

Wee haue also Particular Pooles, where wee make Trialls vpon Fishes, as wee haue said before of Beasts, and Birds.

Wee haue also Places for Breed and Generation of those Kindes of VVormes, and Flies, which are of Speciall Vse; Such as are with you your Silkwormes, and Bees.

I will not hold you long with recounting of our Brew-howfes, Bake-houses, and Kitchens, where are made diuerse Drinks, Breads, and Meates, Rare and of speciall Effects. Wines wee haue of Grapes; And Drinkes of other Iuyce, of Fruits, of Graines, and of Rootes; And of Mixtures with Honey, Sugar, Manna, and Fruits dryed, and decocted: Also of the Teares or Woundings

dings of Trees ; And of the Pulp of Canes. And these Drinckes are of Seuerall Ages, some to the Age or Last of forty yeares. Wee haue Drinckes also brewed with Seuerall Herbs, and Roots, and Spices ; Yea, with seuerall Fleshes, and VVhite-Meats ; Whereof some of the Drinckes are such as they are in effect Meat and Drinke both : So that Diuers, especially in Age, doe desire to liue with them, with little or no Meat, or Bread. And aboue all wee strue to haue Drinckes of Extreame Thin Parts ; To insinuate into the Body, and yet without all Biting, Sharpnesse, or Fretting ; Inso-much as some of them, put upon the Backe of your Hand, will, with a little stay, passe thorow to the Palme, and yet taste Milde to the Mouth. Wee haue also Wwaters, which wee ripen in that fashion, as they become Nourishing ; So that they are indeed excellent Drinke ; And many will vse no other. Breads wee haue of Seuerall Graines, Roots, and Kernels ; Yea and some of Flesh, and Fish, Dried ; With diuers kindes of Leaue-nings, And Seasonings : So that some doe extremely moue Appetittes ; Some doe Nourish so, as Diuers doe liue of them, without any other Meat ; Who liue very long. So for Meats, wee haue some of them so beaten, and made tender, and mortified, yet without all Corrupting, as a VVeake Heat of the Stomacke will turne them into good Chylus ; As well as a Strong Heat would Meat otherwise prepared. Wee haue

some

some Meats also, and Breads, and Drinks, which taken by Men, enable them to Fast long after; And some other, that used make the very Flesh of Mens Bodies, sensibly, more Hard and Tough; And their Strength farre greater, than otherwise it would be.

Wee haue Dispensatories, or Shops of Medicines. Wherein you may easily thinke, if wee haue such Variety of Plants, and Liuing Creatures, more than you haue in Europe, (for wee know what you haue,) the Simples, Drugges, and Ingredients of Medicines, must likewise be in so much the greater Varietie. Wee haue them likewise of diuers Ages, and long Fermentations. And for their Preparations, wee haue not onely all Manner of Exquisite Distillations, and Separations, and especially by Gentle Heats, and Percolations through diuerse Strainers, yea and Substances; But also exact Formes of Composition, whereby they incorporate almost as they were Naturall Simples.

Wee haue also diuers Mechanicall Arts, which you haue not; And Stuffles made by them; As Papers, Linnen, Silkes, Tissues; dainty Workes of Feathers of wonderfull Lustre; excellent Dies, and many others: And Shops likewise as well for such as are not brought into Vulgar use amongst vs, as for those that are. For you must know, that of the Things before recited, many of them are growne into use throughout the Kingdome; But
f yet,

yet, if they did flow from our Inuention, wee haue of them also for Patternes, and Principalls.

Wee haue also Fournaces of great Diuersities, and that keepe great Diuersitie of Heats: Fierce and Quicke; Strong and Constant; Soft and Milde; Blowne, Quiet, Drie, Moist; And the like. But aboue all wee haue Heats, in Imitation of the Sunnes and Heauenly Bodies Heats, that passe diuerse Inequalities, and (as it were) Orbs, Progresses, and Returnes, wherby wee produce admirable effects. Besides wee haue Heates of Dunges; and of Bellies and Mawes of Liuing Creatures and of their Bloods, and Bodies; and of Hayes and Herbs layd vp moist; of Lime vnquenched; and such like. Instruments also which generate Heate onely by Motion. And further, Places for Strong Insolations; And againe, Places vnder the Earth, which by Nature, or Art, yeeld Heate. These diuers Heats wee vse, As the Nature of the Operation, which wee intend, requireth.

Wee haue also Perspective-houses, where wee make Demonstrations of all Lights, and Radiations: And of all Colours: And out of Things vncoloured and Transparent, wee can represent vnto you all seuerall Colours; Not in Raine-bowes, (as it is in Gemmes, and Prismes,) but of themselves Single. Wee represent also all Multiplications of Light, which wee carry to great Distance; and make so Sharpe, as to discerne small Points

Points and Lines. Also all Colourations of Light. All Delusions and Deceits of the Sight, in Figures, Magnitudes, Motions, Colours: All Demonstrations of Shadowes. Wee finde also diuerse Meanes yet vnknowne to you, of Producing of Light, originally, from diuerse Bodies. Wee procure meanes of Seeing Objects a-farr off, As in the Heauen, and Remote Places: And represent Things Neare as A-farr off, And Things A-farr off as Neare, Making Fagined Distances. Wee haue also Helps for the Sight, farr aboue Spectacles and Glasses in vse. Wee haue also Glasses and Meanes, to see Small and Minute Bodies, perfectly and distinctly; As the Shapes and Colours of Small Flies and Wormes, Graines and Flawes, in Gemmes which cannot otherwise be seene, Observations in Vrine and Bloud not otherwise to be seen. Wee make Artificiall Raine-Bowes, Halo's, and Circles about Light. Wee represent also all manner of Reflexions, Refractions, and Multiplications of Visuall Beames of Objects.

Wee haue also Pretious Stones of all kindes, many of them of great Beauty and to you vnknowne: Chystalls likewise; And Glasses of diuerse kindes; And amongst them some of Mettals Vitricated, and other Materialls, besides those of which you make Glasse. Also a Number of Fossiles, and Imperfect Mineralls, which you haue not. Likewise Loadstones of Prodigious Vertue: And other rare Stones, both Naturall and Artificiall.

Wee haue also Sound-houses, wher wee practise and demonstrate all Sounds, and their Generation. Wee haue Harmonies which you haue not, of Quarter-Sounds, and lesser Slides of Sounds. Diuerse Instruments of Musicke likewise to you vnknowne, some sweeter than any you haue; Together with Bells and Rings that are dainty and sweet. Wee represent Small Sounds as Great and Deepe; Likewise Great Sounds, Extenuate and Sharpe; Wee make diuerse Tremblings and Warblings of Sounds, which in their Originall are Entire. Wee represent and imitate all Articulate Sounds and Letters, and the Voices and Notes of Beasts and Birds. Wee haue certaine Helps, which set to the Eare doe further the Hearing greatly. Wee haue also diuerse Strange and Artificiall Echo's, Reflecting the Voice many times, and as it were Tossing it: And some that giue back the Voice Lower than it came, some Shriller, and some Deeper; Yea some rendering the Voice, Differing in the Letters or Articulate Sound, from that they receiue. Wee haue also meanes to conuey Sounds in Trunkes and Pipes, in strange Lines and Distances.

Wee haue also Perfume-Houses; wherewith wee ioyne also Practises of Taste. Wee Multiply Smells, which may seeme strange. Wee Imitate Smells, making all Smells to breath out of other Mixtures than those that giue them. Wee make diuerse Imitations of Taste likewise, so that they will

will deceyue any Mans Taste. And in this House wee containe also a Confiture-House; where wee make all Sweet Meates, Dry and Moist; And diuerse pleasant Wines, Milks, Broaths, and Sallets, farr in greater variety, than you haue.

Wee haue also Engine-Houses, where are prepared Engines and Instruments for all Sorts of Motions. There wee imitate and practise to make Swifter Motions, than any you haue, either out of your Musketts, or any Engine that you haue: And to Make them, and Multiply them more Easily, and with Small Force, by Wheelles, and other Meanes: And to make them Stronger, and more Violent, than yours are; Exceeding your greatest Cannons and Basilisks. Wee represent also Ordnance and Instruments of VVarr, and Engines of all Kinds: And likewise New Mixtures and Compositions of Gun-Powder, Wilde-Fires burning in VVater, and Vnquenchable. Also Fire-workes of all Variety both for Pleasure, and Vle. Wee imitate also Flights of Birds; Wee haue some Degrees of Flying in the Ayre. Wee haue Shippes and Boates for Going vnder VVater, and Brooking of Seas; Also Swimming-Girdles and Supporters. Wee haue diuers curious Clocks; And other like Motions of Returne: And some Perpetuall Motions. Wee imitate also Motions of Liuing Creatures, by Images of Men, Beasts, Birds, Fishes, and Serpents, Wee haue also a

great Number of other Various Motions, strange for Equality, Finenesse, and Subtilty.

We haue also a Mathematicall-House where are represented all Instrumets, as well of Geometry, as Astronomy, exquisitely made.

Wee haue also Houses of Deceits of the Senses; where wee represent all manner of Feats of Iuggling, False Apparitions, Impostures, and Illusions; And their Fallaces. And surely you will easily beleeeue, that wee, that haue so many Things truly Naturall, which induce Admiration, could in a VVorld of Particulars deceiue the Senses, if wee would disguise those Things, and labour to make them seeme more Miraculous. But wee doe hate all Impostures, and Lies: Insomuch as we haue seuerely forbidden it to all our Fellowes, vnder paine of Ignominy and Fines, that they doe not shew any Naturall worke or Thing, Adorned or Swelling; but onely Pure as it is, and without all Affectation of Strangenesse.

These are (my Sonne) the Riches of Salomons House.

For the seuerall Employments and Offices of our Fellowes; Wee haue Twelue that Sayle into Forraine Countreys vnder the Names of other Nations, (for our owne wee conceale;) Who bring vs the Bookes, and Abstracts, and Patternes of Experiments of all other Parts.

These

These wee call Merchants of Light.

Wee haue Three that Collect the Experiments which are in all Booke. These wee call Depredators.

Wee haue Three that Collect the Experiments of all Mechanicall Arts; And also of Liberall Sciences; And also of Practises which are not Brought into Arts. These wee call Mystery-men.

Wee haue Three that try New Experiments such as themselves thinke good. These wee call Pioners or Miners.

Wee haue Three that Draw the Experiments of the Former Foure into Titles, and Tables, to giue the better light for the drawing of Obseruations and Axiomes out of them. These wee call Compilers.

Wee haue Three that bend themselves, Looking into the Experiments of their Fellowes, and cast about how to draw out of them Things of Vse, and Practise for Mans life, and Knowledge, as well for VVorkes as for Plaine Demonstration of Causes, Meanes of Naturall Diuinations, and the easie and cleare Discouery of the Vertues and Parts of Bodies. These wee call Dowry-men or Benefactors.

*Then after diuerse Meetings and Consults of our whole Number, to consider of the former Labours and Collections, wee haue Three that take care, out of them, to Direct New Experiments, of a
Higher*

Higher Light, more Penetrating into Nature than the Former. These wee call Lamps.

Wee haue Three others that doe Execute the Experiments so Directed, and Report them. These wee call Inoculators.

Lastly, wee haue Three that raise the former Discoveries by Experiments, into Greater Observation, Axiomes, and Aphorismes. These wee call Interpreters of Nature.

Wee haue also, as you must thinke, Nouices and Apprentices, that the Succession of the former Employed Men doe not faile; Besides a great Number of Seruants and Attendants, Men and Women. And thus wee doe also: Wee haue Consultations, which of the Inuentions and Experiences, which wee haue discovered, shall bee Published, and which not: And take all an Oath of Secrecie, for the Concealing of those which wee thinke fit to keepe Secret: Though some of those wee doe reueale sometimes to the State, and some not.

For our Ordinances and Rites: Wee haue two very Long, and Faire Galleries: In one of these wee place Patterns and Samples of all manner of the more Rare and Excellent Inuentions: In the other wee place the Statua's of all Principall Inuentours. There wee haue the Statua of your Columbus, that discovered the

VVest

West-Indies : Also the Inuentour of Shipps :
Your Monke that was the Inuentour of Ordnance,
and of Gunpowder : The Inuentour of Mu-
sicke : The Inuentour of Letters : The Inuen-
tour of Printing : The Inuentour of Obserua-
tions of Astronomy : The Inuentour of Works
in Mettall : The Inuentour of Glasse : The In-
uentour of Silke of the Worme : The Inuen-
tour of Wine : The Inuentour of Corne and
Bread : The Inuentour of Sugars : And all
these, by more certaine Tradition, than you haue.
Then haue wee diuerse Inuentours of our Owne,
of Excellent Works ; Which since you haue not
seene, it were too long to make Descriptions of
them ; And besides, in the right Understanding
of those Descriptions you might easily erre. For
vpon euery Inuention of Valem, wee erect a Sta-
tua to the Inuentour, and giue him a Liberall and
Honourable Reward. These Statua's are, some
of Brasse ; some of Marble and Touchstone ;
some of Cedar and other speciall Woods gilt
and adorned ; some of Iron ; some of Siluer ; some of
Gold.

We haue certaine Hymnes and Seruices, which
wee say dayly, of Laud and Thankes to God for
his Marueilous Works : And Formes of Pray-
ers, imploring his Aide and Blessing, for the Illu-
mination of our Labours, and the turning of them
into Good and Holy Vses.

Lastly, wee haue Circuits or Visits, of diuerse
Principall

Principall Citties of the Kingdome; where as it cometh to passe, wee doe publish such New Profitable Inuentions, as wee thinke good. And wee doe also declare Naturall Diuinations of Diseases, Plagues, Swarmes of Hurtfull Creatures, Scarcety, Tempests, Earthquakes, Great Inundations, Cometts, Temperature of the Yeare, and diuerse other Things; And wee giue Counsell thereupon, what the People shall doe, for the Preuention and Remedy of them.

And when Hee had sayd this, Hee stood vp: And I, as I had beene taught, kneeled downe; and Hee layd his Right Hand vpon my Head, and sayd; GOD *blesse thee, my Sonne,* And GOD *blesse this Relation, which I haue made.* I giue thee leaue to Publish it, for the Good of other Nations; For wee here are in GODS Bosome, a Land vnknowne. And so hee left mee; Hauing assigned a valew of about two Thousand Duckets, for a Bounty to mee and my Fellowes. For they giue great Largeesses, where they come, vpon all occasions.

The rest was not Perfected.



To the Reader.



HAuing had the Honour to bee continually with my Lord, in compiling of this *Worke*; And to be employed therein; I haue thought it not amisse, (with his Lordships good leaue and liking,) for the better satisfaction of those that shall reade it, to make knowne somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I haue heard his Lordship often say; that if hee should haue serued the glory of his owne Name, hee had beene better not to haue published this *Naturall History*: For it may seeme an Indigested Heape of Particulars, And cannot haue that Lusture, which Bookes cast into Methods haue: But that he resolved to preferre the good of Men, and that which might best secure it, before any thing that might haue Relation to Himselfe. And he knew well, that

A

there

there was no other way open, to vnloose Mens mindes, being bound; and (as it were) Maleficate, by the Charmes of deceiuing Notions, and Theories; and thereby made Impotent for Generation of Workes; but onely no where to depart from the Sense, and cleare experience; But to keepe close to it, especially in the beginning: Besides, this *Naturall History* was a Debt of his, being Designed and set downe for a third part of the *Instauration*. I haue also heard his Lordship discourse, that Men (no Doubt) will thinke many of the *Experiments* contained in this Collection, to bee Vulgar and Triuiall; Meane and Sordid; Curious and Fruitlesse: And therefore hee wisheth, that they would haue perpetually before their Eyes, what is now in doing; And the Difference betweene this *Naturall History*, and others. For those *Naturall Histories*, which are Extant, being gathered for Delight and Vse, are full of pleasant Descriptions and Pictures; and affect and seek after Admiracion, Rarities, and Secrets. But contrariwise, the Scope which his Lordship intendeth, is to write such a *Naturall History*, as may be Fundamentall to the Erecting and Building of a true *Philosophy*: For the illumination of the *Vnderstanding*; the Extracting of *Axiomes*; and the producing of many Noble *Workes*, and *Effects*. For hee hopeth, by this meanes, to acquit Himselfe of that, for which hee taketh
Himselfe

Himselfe in a sort bound; And that is, the Advancement of all Learning & Sciences. For having in this present Worke Collected the Materials for the Building; And in his *Novum Organū* (of which his Lordship is yet to publish a second Part,) set downe the Instruments and Directions for the worke, Men shall now bee wanting to themselves, if they raise not Knowledge to that perfection, whereof the Nature of Mortall men is capable. And in this behalfe, I have heard his Lordship speake complainingly; That his Lordship (who thinkth hee deserueth to bee an Architect in this building,) should bee forced to bee a Work-man and a Labourer; And to dig the Clay and burne the Brick; And more than that, (according to the hard Condition of the *Israelites* at the latter end) to gather the Straw and Stubble, ouer all the Fields, to burne the Bricks withall. For he knoweth, that except he doe it, nothing will bee done: Men are so set to despise the Meanes of their owne good. And as for the *Basenesse* of many of the Experiments; As long as they be Gods Works, they are Honourable enough. And for the *Vulgar-nesse* of them; true *Axiomes* must bee drawne from plaine Experience, and not from doubtful; And his Lordships course is, to make Wonders Plaine, and not Plaine things Wonders; And that Experience likewise must bee broken and grinded, and not whole, or as it

groweth. And for *Vse*; his Lordship hath often in his Mouth, the two kinds of *Experiments*; *Experimenta Fructifera*, and *Experimenta Lucifera*: *Experiments* of *Vse*, and *Experiments* of *Light*; And hee reporteth himselfe, whether hee were not a strange Man, that should thinke that *Light* hath no *Vse*, because it hath no *Matter*. Further, his Lordship thought good also, to adde vnto many of the *Experiments* themselves, some *Glosse* of the *Causes*; that in the succeeding worke of *Interpreting Nature*, and *Framing Axiomes*, all things may bee in more Readinesse. And for the *Causes* herein by him assigned; his Lordship perswadeth Himselfe, they are farre more certaine, than those that are rendred by Others; not for any Excellency of his owne *VVit* (as his Lordship is wont to say) but in respect of his continuall Conuersation with *Nature* and *Experience*. Hee did consider likewise, that by his Addition of *Causes*, Mens minds (which make so much haste to find out the *Causes* of things;) would not thinke themselves vtterly lost, in a Vast *VVood* of *Experience*, but stay vpon these *Causes* (such as they are) a litle, till true *Axiomes* may bee more fully discovered. I haue heard his Lordship say also, that one great Reason, why hee would not put these particulars into any exact *Method* (though hee that looketh attentiuely into them shall finde that they haue a secret
(Order

TO THE READER.

Order) was, because hee conceiued that other men would now thinke, that they could doe the like ; And so goe on with a further Collection ; which if the *Method* had beene Exact, many would haue despaired to attaine by Imitation. As for his Lordships loue of Order, I can refer any Man to his Lordships Latine Booke, *De Augmentis Scientiarum* ; which (if my Iudgement bee any thing) is written in the Exactest Order, that I know any Writing to be. I will conclude with an vsuall Speech of his Lordships ; That this Worke of his *Naturall History*. is the *World* as God made it, and not as Men haue made it ; For that it hath nothing of Imagination.

W. Rawley.

This Epistle is the same, that should haue beene prefixed to this Booke, if his Lordship had liued.

God made it, and not as Men have made it. For
that it hath nothing of Imagination.
I know my Writing to be I will conclude with
an vsmall Speech of his Lordships: That this
Woork of his Vntuersitie is made as
God made it, and not as Men have made it. For
that it hath nothing of Imagination.

W. R.

A



TO THE MOST HIGH
AND MIGHTY PRINCE
CHARLES,
BY THE GRACE OF GOD,
King of *Great Britaine, France, and*
Ireland, Defender of the Faith, &c.

May it please your most Excellent Maiesty ;



He whole Body of the *Natu-
rall Hystory*, either designed,
or written, by the late *Lo.
Viscount S. Alban*, was dedi-
cated to your *Maiestie*, in his
Booke De Ventis, about foure
yeeres past, when your *Maiestie* was *Prince* :
So as there needed no new Dedication of this
Worke, but only, in all humbleness, to let your
Maiestie know, it is yours. It is true, if that *Lo.*
had liued, your *Maiestie*, ere long, had beene
inuoked, to the Protection of another *Historie* :
VVhereof, not *Natures Kingdome*, as in this,
but

The Epistle Dedicatorie.

but these of your *Maiesties*, (during the Time and ~~Reigne~~ of *King Henry the Eighth*) had beene the Subiect: Which since it died vnder the Designation meerely, there is nothing left, but your *Maiesties* Princely Goodnesse, graciously to accept of the Vndertakers Heart, and Intentions, who was willing to haue parted, for a while, with his Darling *Philosophie*, that he might haue attended your Royall Commandement, in that other *Worke*. Thus much I haue beene bold, in all lowlinesse, to represent vnto your *Maiestie*, as one that was trusted with his *Lordships Writings*, euen to the last. And as this *Worke* affecteth the *Stampe* of your *Maiesties Royall Protection*, to make it more currant to the *World*; So vnder the *Protection* of this *Worke*, I presume in all humblenessse to approach your *Maiesties* presence; And to offer it vp into your *Sacred Hands*.

Your *MAIESTIES* most Loyall

and Deuoted Subiect,

W. RAWLEY.



NATVRALL HISTORIE.

I. Century.



Digge a Pit vpon the *Sea-shore*, somewhat aboue the High-Water Marke, and sinke it as deepe as the Low-Water Marke; And as the Tide commeth in, it will fill with *water*, Fresh and Potable. This is commonly practised vpon the Coast of *Barbarie*, where other fresh *water* is wanting. And **CÆSAR** knew this well, when hee was besieged in *Alexandria*: For by digging of Pits in the *Sea-shore*, hee did frustrate the Laborious Workes of the

Enemies, which had turned the *Sea-water* vpon the Wels of *Alexandria*; And so saued his Armie, being then in Desperation. But **Cæsar** mistooke the Cause; For he thought that all *Sea-Sands* had Naturall Springs of *Freshwater*. But it is plaine, that it is the *Sea-water*; because the Pit filleth according to the Measure of the Tide: And the *Sea-water* passing or Straining thorow the Sands, leaueth the Saltnesse.

I remember to haue read, that Triall hath beene made of *Salt water* passed thorow *Earth*; thorow Ten Vessels, one within another, and yet it hath not lost his Saltnesse, as to become potable: But the same Man saith, that (by the Relation of Another) *Salt water* drained thorow Twenty Vessels hath become Fresh. This Experiment seemeth to crosse that other of Pits, made by the *Sea-side*; And yet but in part, if it be true that twenty Repetitions doe the Effect. But it is worth the Note, how poore the Imitations of Nature are, in Common course of Experiments, except they bee led by great Iudgement, and some good Light of *Axiomes*. For first, there is no small difference between a

Passage

I
Experiments
in Consort tou-
ching the
Straining and
passing of Bo-
dies, one tho-
rew another:
which they call
Percolation.

Passage of *Water* thorow twenty small Vessels ; And thorow such a distance, as betweene the Low water, and High water Marke. Secondly, there is a great difference betweene Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free : And besides Earth doth not straine the *Water* so finely, as Sand doth. But there is a Third Point, that I suspect as much, or more, than the other Two : And that is, that in the *Experiment* of *Transmission* of the *Sea-water* into the *Pits*, the *Water* riseth ; But in the *Experiment* of *Transmission* of the *Water* thorow the Vessels, it falleth : Now certaine it is, that the Salter Part of *Water*, (once Salted thorow-out) goeth to the Bottom. And therefore no marvell, if the Draining of *Water* by descent, doth not make it fresh : Besides, I doe somewhat doubt, that the very Dashing of the *Water*, that commeth from the Sea, is more proper to strike off the Salt Part, than where the *Water* slideth of her owne Motion.

3 It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*,) is a good kinde of *Separation* ; Not onely of Thicke from Thin, and Grosse from Fine ; But of more subtile Natures ; And varieth according to the Body thorow which the *Transmission* is made. As if thorow a woollen Bagge, the Liquor leaueth the Fatnesse ; If thorow Sand, the Saltnesse ; &c. They speake of *Seuering* Wine from *Water*, passing it thorow luy wood, or thorow other the like porous Body ; But *Non Constat*.

4 The *Gumme* of *Trees* (which wee see to bee commonly shining and cleare) is but a fine Passage or *Straining* of the Juice of the Tree, thorow the Wood and Barke. And in like manner, *Cornish Diamonds*, and *Rocke Rabies*, (which are yet more resplendent than *Gummes*) are the fine Exudations of *Stone*.

5 *Aristotle* giueth the Cause, vainely, why the *Feathers* of *Birds* are of more lively Colours, than the *Haires* of *Beasts* ; for no *Beast* hath any fine Azure, or Carnation, or Greene *Haire*. Hee saith, it is, because *Birds* are more in the Beames of the Sunne, than *Beasts* ; But that is manifestly vntrue ; For *Cattle* are more in the Sun than *Birds*, that liue commonly in the Woods, or in some Couert. The true Cause is, that the Excrementious Moisture of living Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* thorow a finer and more delicate Strainer, than it doth in *Beasts* : For *Feathers* passe thorow Quils ; And *Haire* thorow Skin.

6 The *Clarifying* of *Liquors* by Adhesion is an Inward *Percolation* ; And is effected, when some Cleauing Body is Mixed and Agitated with the *Liquors* ; whereby the grosser Part of the *Liquor* stickes to that Cleauing Body ; And so the Finer Parts are freed from the Grosser. So the *Apothecaries* clarify their *Sirrups* by whites of Egges, beaten with the Juices which they would clarify ; which Whites of Egges, gather all the Dregges and grosser Parts of the Juice to them ; And after the *Sirrup* being set on the Fire, the Whites of Egges themselues harden, and are

are taken forth. So *Ippocrasse* is clarified by mixing with Milke; And stirring it about; And then passing it thorow a Woollen Bag, which they call *Hippocrates Sleene*: And the Cleaung Nature of the Milke draweth the Powder of the Spices, and Groffer Parts of the *Liquor* to it; And in the passage they sticke vpon the Woollen Bag.

The *Clarifying* of *water*, is an *Experiment* tending to Health; besides the pleasure of the Eye, when *water* is Chrystalline. It is effected by casting in and placing Pebbles, at the Head of a Current; that the *water* may straine thorow them.

It may bee, *Percolation* doth not onely cause Clearenesse and Splendor, but Sweetnesse of Sauour; For that also followeth, as well as Clearenesse, when the Finer Parts are seuered from the Groffer. So it is found, that the Sweats of men that haue much Heat, and exercise much, and haue cleane Bodies, and fine Skins, doe smell sweet; As was said of *Alexander*; And wee see commonly, that *Gummes* haue sweet Odours.

TAke a *Glasse*, and put *water* into it, and wet your Finger, and draw it round about the Lip of the *Glasse*, pressing it somewhat hard; And after you haue drawne it some few times about; it will make the *Water* friske and sprinkle vp in a fine Dew. This *Instance* doth excellently Demonstrate the Force of *Compression* in a Sollid Body. For whensoever a Sollid Body (as Wood, Stone, Mettall, &c.) is pressed, there is an inward Tumult in the Parts thereof; seeking to deliuer themselves from the *Compression*: And this is the Cause of all *Violent Motion*. Wherein it is strange in the highest Degree, that this *Motion* hath neuer beene obserued, nor inquired: It being of all *Motions*, the most Common, and the Chiefe Root of all *Mechanicall Operations*. This *Motion* worketh in round at first, by way of Prooffe, and Search, which way to deliuer it selfe; And then worketh in progresse, where it findeth the Deliuernce easiest. In *Liquors* this *Motion* is visible: For all *Liquors* stricken make round Circles, and withall Dash; but in *Solids*, (which breake not) it is so subtrill, as it is inuisible; But neuertheless bewrayeth it selfe by many Effects; As in this *Instance* whereof wee speake. For the *Pressure* of the Finger furthered by the wetting (because it sticketh so much the better vnto the Lip of the *Glasse*) after some continuance, putteth all the small Parts of the *Glasse* into worke; that they strike the *water* sharply: from which *Percussion* that Sprinkling commeth.

Experiments
in Confort
touching *Mo-*
tion of *Bodies*
vpon their
Pressure.

9

If you strike or pierce a *Solid Body*, that is brittle, as *Glasse*, or *Sugar*, it breaketh not onely, where the immediate force is; but breaketh all about into shiuers and fitters; The *Motion*, vpon the *Pressure*, searching all wayes; and breaking where it findeth the *Body* weakest.

10

The *Powder* in *Shot*, being Dilated into such a *Flame*, as endureth not *Compression*; Moueth likewise in round (The *Flame* being in the Nature of a *Liquid Body*;) Sometimes recoiling; Sometimes breaking the *Piece*;

11

But

But generally discharging the *Bullet*, because there it findeth easiest Deliverance.

12

This *Motion* vpon *Pressure*, and the Reciprocall thereof, which is *Motion* vpon *Tensure*; wee vse to call (by one common Name) *Motion of Liberty*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or Demension, delivereth and restoreth it selfe to the *Naturall*: As when a *Blowne Bladder* (Pressed) riseth againe; or when *Leather* or *Cloth* tentured spring backe. These two *Motions* (of which there bee infinite instances) we shall handle in due place.

13

This *Motion* vpon *Pressure* is excellently also demonstrated in *Sounds*; As when one Chimeth vpon a *Bell*, it soundeth; but as soone as hee layeth his hand vpon it, the *Sound* ceaseth: And so, the *Sound* of a *Virginall String*, as soone as the *Quill* of a *Iacke* falleth vpon it, stoppeth. For these *Sounds* are produced, by the subtill Percussion of the Minute parts, of the *Bell*, or *String*, vpon the *Aire*; All one, as the *water* is caused to leape by the subtille Percussion of the Minute parts of the *Glasse*, vpon the *Water*, whereof wee spake a little before in the ninth *Experiment*. For you must not take it to bee, the locall *Shaking* of the *Bell*, or *String*, that doth it. As wee shall fully declare, when wee come hereafter to handle *Sounds*.

Experiments
in Consort touch-
ing Separations
of Bodies by
weight.

14

Take a *Glasse* with a *Belly* and a long *Neb*; fill the *Belly* (in part) with *Water*: Take also another *Glasse*, whereinto put *Claret Wine* and *Water* mingled: Reuerse the first *Glasse*, with the *Belly* vpwards, Stopping the *Neb* with your finger; Then dip the Mouth of it within the Second *Glasse*, and remoue your Finger: Continue it in that posture for a time; And it will vnmingle the *wine* from the *water*: The *Wine* ascending and setting in the top of the upper *Glasse*; And the *water* descending and setting in the bottome of the lower *Glasse*. The passage is apparant to the Eye; For you shall see the *wine*, as it were, in a small veine; rising thorow the *Water*. For handsonnes sake (because the Working requireth some small time) it were good you hang the vpper *Glasse* vpon a Naile. But as soone as there is gathered so much pure and vnmixed *water* in the bottome of the Lower *Glasse*, as that the Mouth of the vpper *Glasse* dippeth into it, the *Motion* ceaseth.

15

Let the Vpper *Glasse* bee *wine*, and the Lower *water*; there followeth no *Motion* at all. Let the Vpper *Glasse* bee *water* pure, the Lower *water* coloured; or contrariwise; there followeth no *Motion* at all. But it hath beene tried, that though the Mixture of *Wine* and *water*, in the Lower *Glasse*, bee three parts *water*, and but one *wine*; yet it doth not dead the *Motion*. This Separation of *water* and *Wine* appeareth robee made by *Weight*; for it must bee of *Bodies* of vnequall *weight*, or else it worketh not; And the Heauier *Body* must euer bee in the vpper *Glasse*. But then note withall, that the *water* being made pensile, and there being a great *Weight* of *water* in the *Belly* of the *Glasse*, sustained by

by a small Pillar of *Water* in the Necke of the *Glasfe*; It is that which setteth the *Motion* on worke: For *Water* and *Wine* in one *Glasfe*, with long standing, will hardly seuer.

This *Experiment* would be Extended from Mixtures of seuerall *Liquours* to *Simple Bodies*, which Consist of seuerall Similare Parts: Try it therefore with *Brine* or *Salt Water*, and *Fresh Water*; Placing the *Salt Water* (which is the heatier) in the vpper *Glasfe*. And see whether the *Fresh* will come aboue. Try it also with *Water thicke Sugred*, and *Pure Water*; and see whether the *Water* which commeth aboue, will lose his sweetnesse: For which purpose it were good there were a little Cocke made in the Belly of the vpper *Glasfe*.

IN *Bodies* containing Fine Spirits, which doe easily dissipate, when you make *Infusions*, the Rule is; A short stay of the *Body* in the *Liquor* receiveth the Spirit; And a longer Stay confoundeth it; because it draweth forth the Earthly Part withall; which embaseth the finer. And therefore it is an Errour in *Physicians*, to rest simply vpon the Length of stay, for increasing the vertue. But if you will haue the *Infusion* strong, in those kinde of *Bodies*, which haue fine Spirits, your way is, not to giue Longer time, but to repeat the *Infusion* of the *Body* oftner. Take *Violets*, and infuse a good Pugill of them in a Quart of Vineger; Let them stay three quarters of an houre, and take them forth; And refresh the *Infusion* with like quantity of new *Violets*, seuen times; And it will make a Vineger so fresh of the *Flower*, as if a Twelue-moneth after, it bee brought you in a Saucer, you shall smell it before it come at you. Note, that it smelleth more perfectly of the *Flower*, a good while after, than at first.

This Rule, which wee haue giuen, is of singular vse, for the Preparations of *Medicines*, and other *Infusions*. As for Example; The Lease of *Burrage* hath an excellent Spirit, to repress the Fuliginous Vapour of Dusky Melancholy, and so to cure Madnesse: But neuertheless, if the Lease be infused long, it yeeldeth forth but a raw substance, of no Vertue; Therefore I suppose, that if in the Must of Wine, or Wort of Beere, while it worketh, before it bee Tuned, the *Burrage* stay a small time, and bee often changed with fresh; It will make a Soueraigne Drinke for Melancholy Passions. And the like I conceive of *Orange Flowers*.

Rubarb hath manifestly in it Parts of contrary Operations: Parts that purge; And parts that binde the Body: And the first lay looser, and the latter lay deeper: So that if you infuse *Rubarb* for an houre, and crush it well, it will purge better, and binde the Body lesse after the purging, than if it stood twenty foure houres; This is tried: But I conceive likewise, that by Repeating the *Infusion* of *Rubarb*, seuerall times, (as was said of *Violets*) letting each stay in but a small time; you may make it as strong a *Purging Medicine*, as *Scammony*. And it is not a small thing wenne in *Physicke*, if you can make *Rubarb*, and other *Medi-*

cines

16

Experiments
in Confort tou-
ching Indicions
and Accurate
Infusions, both
in Liquors, and
Aire.

17

18

19

things that are *Benedict*, as strong Purgers, as those that are not without some Malignity.

20

Purging Medicines; for the most part, haue their *Purgative* Vertue, in a fine Spirit; As appeareth by that they endure not boiling, without much losse of Vertue. And therefore it is of good vse in *Physicke*, if you can retaine the *Purging* Vertue, and take away the Vnpleasant taste of the *Purger*; which it is like you may doe; by this course of *Infusing* oft, with little stay. For it is probable, that the Horrible and Odious Taste, is the Groffer part.

21

Generally, the working by *Infusions*, is grosse and blinde, except you first try the Issuing of the seuerall Parts of the Body, which of them Issue more speedily, and which more slowly; And so by apportioning the time, can take and leaue that Quality, which you desire. This to know, there be two wayes; The one to try what long stay, and what short stay worketh, as hath beene said: The other to try in Order, the succeeding *Infusions*, of one and the same Body, successiue, in seuerall *Liquours*. As for example; Take *Orange-Pils*, or *Rose-Mary*, or *Cinnamon*, or what you will; And let them *infuse* halfe an houre in *Water*: Then take them out, and *Infuse* them againe in other *Water*; And so the third time: And then taste and consider the *First Water*, the *Second*, and the *Third*: And you will finde them differing, not onely in Strength and Weaknesse, but otherwise in Taste, or Odour; For it may be the *First Water* will haue more of the Scent, as more Fragrant; And the *Second* more of the Taste, as more Bitter or Biting, &c.

22

Infusions in *Aire*, (for so we may well call *Odours*) haue the same diuersities with *Infusions* in *Water*; In that the seuerall *Odours* (which are in one Flower, or other Body) issue at seuerall times; Some earlier, some later: So wee finde that *Violets*, *woodlines*, *Strawberries*, yeeld a pleasing Scent, that commeth forth first; But soone after an ill Scent, quite differing from the Former; Which is caused, not so much by Mellowing, as by the late issuing of the Groffer Spirit.

23

As wee may desire to extract the finest Spirits in some Cases; So wee may desire also to discharge them (as hurtfull) in some other. So *Wine burnt*, by reason of the Euaporating of the finer Spirit, enflameth lesse, and is best in Agues: *Opium* leeseeth some of his poisonous Quality, if it be vaporated out, mingled with *Spirit of Wine*, or the like: *Scam* leeseeth somewhat of his windinesse by Decocting; And (generally) subtil or windy Spirits are taken off by incension, or Euaporation. And euen in *Infusions* in things that are of too high a Spirit, you were better powre off the first *Infusion*, after a small time, and vse the latter.

Experi.
Solitary tou-
ching the ap-
petite of Con-
tinuations in
Liquids.

24

Bubbles are in the forme of an *Hemisphere*; *Aire* within, and a little Skin of *Water* without: And it seemeth somewhat strange, that should rise so swiftly, while it is in the *Water*; And when it cometh to the Top, should bee staied by so weake a Couer as that of the *Water* is. But as for the swift Assent of the *Aire*, while it is vnder the

the *Water*, that is a *Motion* of *Percussion* from the *Water*; which it selfe descending, driueth vp the *Aire*; And no *Motion* of *Leuity* in the *Aire*. And this *Democritus* called *Motus Plage*. In this Common *Experiment*, the Cause of the Enclosure of the *Bubble* is, for that the *Appetite* to resist *Séparation*, or *Discontinuance* (which in *solid Bodies* is strong) is also in *Liquours*, though fainter and weaker; As wee see in this of the *Bubble*: Wee see it also in little *Glasses* of *Spittle* that children make of *Rushes*; And in *Castles* of *Bubbles*, which they make by blowing into *Water*, hauing obtained a little *Degree* of *Tenacity* by *Mixture* of *Soape*: Wee see it also in the *stillscides* of *water*, which if there bee *water* enough to follow, will *Draw* themselves into a small thred, because they will not *discontinue*; But if there bee no *Remedy*, then they cast themselves into round *Drops*; Which is the *Figure*, that saueth the *Body* most from *Discontinuance*: The same Reason is of the *Roundnesse* of the *Bubble*, as well for the *Skin* of *Water*, as for the *Aire* within: For the *Aire* likewise auoideth *Discontinuance*; And therefore casteth it selfe into a *Round Figure*. And for the stop and *Arrest* of the *Aire* a little while, it sheweth that the *Aire* of it selfe hath little, or no *Appetite*, or *Ascending*.

THE Reiection, which I continually use, of *Experiments*, (though it appeareth not) is infinite; But yet if an *Experiment* be probable in the *Worke*, and of great *Vse*, I receiue it, but deliuer it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may bee made thus: Finde out a hanging *Ground*, where there is a good quicke *Fall* of *Raine-water*. Lay a *Halfe-Trough* of *Stone*, of a good length, three or foure foot deepe within the same *Ground*; with one end vpon the *High Ground*, the other vpon the *Low*. Cover the *Trough* with *Brakes* a good thickness, and cast *Sand* upon the *Top* of the *Brakes*: You shall see (saith hee) that after some *showers* are past, the lower *End* of the *Trough* will run like a *Spring* of *water*: which is no maruell, if it hold, while the *Raine-water* lasteth; But hee said it would continue long time after the *Raine* is past: As if the *water* did multiply it selfe vpon the *Aire*, by the helpe of the *Coldnesse* and *Condensation* of the *Earth*, and the *Confort* of the first *Water*.

Experiment
Solitary touching the
Making of Artificiall
Springs.

25

THE *French* (which put off the Name of the *French Disease*; vnto the Name of the *Disease* of *Naples*) doe report, that at the *Siege* of *Naples*, there were certaine wicked *Merchants*, that *Barrelled* vp *Mans flesh* (of some that had beene, lately slaine in *Barberr*) and sold it for *Tunny*; And that vpon that foule and high *Nourishment*, was the *Originall* of that *Disease*. Which may well bee; For that it is certaine, that the *Canibals* in the *West Indies*, eat *Mans Flesh*; And the *West Indies* were full of the *Pockes* when they were first discovered: And at this day the *Mortallest Poisons*, practised by the *West-Indians*, haue some *Mixture* of the *Bloud*, or *Fat*, or *Flesh* of *Man*: And diuers *Witches*, and

Experiment
Solitary touching the
Venomous Quality
of Mans flesh.

26

B

Sorce-

Sorceresses, as well amongst the *Heathen*, as amongst the *Christians*, have fed vpon *Mans flesh*, to aid (as it seemeth) their Imagination, with High and foule Vapours.

Experiment
Solitary touch-
ing the Ver-
sion and Trans-
mutation of
Aire into Water.

27

IT seemeth that there bee these wayes (in likelihood) of *Version*, of *Vapours*. or *Aire*, into *Water* and *Moisture*. The first is *Cold*; which doth manifestly condense; As wee see in the *Contracting of the Aire* in the *Weather-Glasse*; Whereby it is a Degree nearer to *water*. Wee see it also in the *Generation of Springs*, which the *Ancients* thought (very probably) to bee made by the *Version of Aire* into *Water*, holpen by the *Rest*, which the *Aire* hath in those Parts; Whereby it cannot dissipate. And by the *Coldnesse of Rockes*; For there *Springs* are chiefly generated. Wee see it also in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; Which produceth *Dewes*, and *Raines*. And the Experiment of turning *Water* into *Ice*, by *Snow*, *Nitre*, and *Salt* (whereof wee shall speake hereafter) would bee transferred to the Turning of *Aire* into *water*. The Second way is by *Compression*; As in *Stillatories*, where the Vapour is turned backe, vpon it selfe, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* vpon the Couers of *Boyling Pots*; And in the *Dew* towards *Raine*, vpon *Marble*, and *wainscot*. But this is like to doe no great effect; Except it bee vpon Vapours, and grosse *Aire*, that are already very neere in Degree to *Water*. The Third is that, which may bee searched into, but doth not yet appeare; which is, by *Mingling of Moist Vapours* with *Aire*; And trying if they will not bring a Returne of more *water*, than the *water* was at first: For if so; That Increase is a *Version* of the *Aire*: Therefore put water into the Bottome of a *Stillatory*, with the *Neb* stopped; Weigh the *water* first; Hang in the Middle of the *Stillatory* a large *Sponge*; And see what Quantity of *water* you can crush out of it; And what it is more, or lesse, compared with the *Water* spent; For you must vnderstand, that if any *Version* can bee wrought, it will bee easiliest done in small Pores: And that is the Reason why wee prescribe a *Sponge*. The Fourth way it Probable also, though not Appearing; Which is, by *Receiuing the Aire* into the small *Pores of Bodies*; For (as hath beene said) euery thing in small Quantity is more easie for *version*; And Tangible Bodies haue no pleasure in the Confort of *Aire*, but endeuour to subact it into a more *Dense Body*: But in *Entire Bodies* it is checked; because if the *Aire* should Condense, there is nothing to succeed: Therefore it must be in *loose Bodies*, as *Sand* and *Powder*; which we see, if they lie close of themselves gather Moisture.

Experiment
Solitary touch-
ing Helpe
towards the
Beauty and
good features
of Persons.

28

IT is reported by some of the *Ancients*; That *whelps*, or other *Creatures*, if they bee put Young, into such a Cage, or Box, as they can not rise to their Stature, but may increase in Breadth, or Length; will grow accordingly, as they can get Roome: which if it bee true, and faisible, and that the young *Creature* so pressed, and streight-
ned,

tened, doth not thereupon dye ; It is a Meanes to produce *Dwarfe Creatures*, and in a very Strange Figure. This is certaine, and noted long since ; That the Pressure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little ; As the Stroaking of the Heads of Infants, betweene the Hands, was noted of Old, to make *Macrocephali* ; which shape of the Head, at that time, was esteemed. And the Railing gently of the Bridge of the Nose, doth prevent the deformity of a Saddle-Nose. Which obseruation well weighed, may reach a Meanes, to make the Persons of Men, and Women, in many kindes, more comely, and better featured, than otherwise they would bee ; By the Forming and Shaping of them in their Infancy : As by Stroaking vp the Calues of the Legs, to keepe them from falling downe too low ; And by Stroaking vp the Fore-head to keepe them from being low-foreheaded. And it is a common Practise to swathe Infants, that they may grow more streight and better shaped : And we see Young Women, by wearing streight Bodies, keepe themselves from being Grosse, and Corpulent.

O Nions, as they hang, will many of them shoot forth ; And so will *Penni roiall* ; And so will an Herbe called *Orpin* ; with which they vse, in the Countrey, to trim their Houses, binding it to a Lath, or Sticke, and setting it against a Wall. We see it likewise, more especially, in the greater *Semper-vine*, which will put out Branches, two or three yeares : But it is true, that commonly they wrap the Root in a Cloth besmeared with *Oile*, and renue it once in halfe a Yeare. The like is reported by some of the *Ancients*, of the *Stalkes of Lillies*. The Cause is ; For that these *Plants* haue a Strong, Dense, and Succulent Moisture, which is not apt to exhale ; And so is able, from the Old store, without drawing helpe from the Earth, to suffice the sprouting of the *Plant* : And this Sprouting is chiefly in the late Spring, or early Sommer ; which are the times of putting forth. Wee see also, that *stumps of Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Consequence, to try whether these things, in the Sprouting, doe increase *Weight* ; which must bee tried by weighing them before they bee hanged vp ; And afterwards againe, when they are Sprouted. For if they increase not in *weight* ; Then it is no more but this ; That what they send forth in the Sprout, they leese in some other Part : But if they gather *Weight*, then it is *Magnale Natura* ; For it sheweth that *Aire* may bee made so to bee Condensed, as to be conuerted into a *Dense Body* ; whereas the Race and the Period of all things, here about the Earth, is to extennate and turne things to be more *Pneumaticall*, and Rare, And not to bee Retrograde, from *Pneumaticall* to that which is *Dense*. It sheweth also, that *Aire* can *Nourish* ; which is another great Matter of Consequence. Note, that to try this, the *Experiment* of the *Semper-vine* must be made without Oiling the Cloth ; For else it may be, the *Plant* receiueth Nourishment from the *Oile*.

Experiment
Solitary tou-
ching the Con-
densing of Aire,
in such sort as
it may put on
weight, and
yeeld Nourish-
ment.

29

Experiment
Solitary tou-
ching the Com-
mixture of
Flame and Aire,
And the great
force thereof.

30

Flame and Aire doe not Mingle, except it bee in an *Instant*; Or in the *Vitall Spirits* of *Vegetables* and *Living Creatures*. In *Gunpowder*, the Force of it hath beene ascribed, to Rarefaction of the Earthly Substance into *Flame*: And thus farre it is true: And then (forsooth) it is become another Element; the Forme whereof occupieth more place; And so, of Necessity, followeth a Dilatation: And therefore, lest two Bodies should bee in one place, there must needs also follow an Expulsion of the Pellet; Or Blowing vp of the Mine. But these are Crude and Ignorant Speculations. For *Flame*, if there were nothing else, except it were in very great quantity, will bee suffocate with any hard Body, such as a Pellet is, or the Batrell of a Gunne; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not suffer it to kindle, or spread. But the cause of this so potent a Motion, is the *Nitre*, (which wee call otherwise *Salt-Petre*;) which hauing in it a notable Crude and windy *spirit*, first, by the *Heat* of the *Fire* suddenly dilateth it selfe; (And wee know that simple *Aire*, being preternaturally attenuated by *Heat*, will make it selfe Roome, and breake and blow vp that which resisteth it;) And Secondly, when the *Nitre* hath dilated it selfe, it bloweth abroad the *Flame*, as an inward Bellows. And therefore we see that *Brimstone*, *Pitch*, *Camphire*, *Wilde-Fire*, and diuers other Inflamable Matters, though they burne cruelly, and are hard to quench; Yet they make no such fiery winde, as *Gunpowder* doth: And on the other side, wee see that *Quick siluer*; (which is a most Crude and Watry Body) heated, and pent in, hath the like force with *Gunpowder*. As for *Living Creatures*, it is certaine, their *Vitall Spirits* are a Substance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* and *Flame* being free, will not well mingle; yet bound in by a *Body* that hath some fixing, they will. For that you may best see in those two Bodies (which are their *Aliments*,) *Water*, and *oile*; For they likewise will not well mingle of themselves, but in the Bodies of *Plants* and *Living Creatures*, they will. It is no maruell therefore, that a small *Quantity* of *Spirits*, in the Cells of the Braine, and Canales of the Sinewes, are able to moue the whole Body, (which is of so great Masse) both with so great Force, as in Wrestling, Leaping; And with so great Swiftnesse, As in playing Diuision vpon the *Lute*. Such is the force of these two Natures, *Aire* and *Flame*, when they incorporate.

Experiment
Solitary tou-
ching the Se-
cret Nature of
Flame.

31

TAke a small *Wax-Candle*, and put it in a Socket, of *Brasse*, or *Iron*; Then set it vpright in a *Porringer* full of *Spirit of Wine*, heated; Then set both the *Candle*, and *Spirit of Wine*, on fire, and you shall see the *Flame* of the *Candle*, open it selfe, and become foure or five times bigger than otherwise it would haue beene; and appeare in Figure *Globular*, and not in *Piramis*. You shall see also, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not wax any whit blue towards the Colour of the Outward *Flame* of the *Spirit of Wine*. This is a Noble;

Instance

Instance; wherein two things are most remarkable; The one; that one *Flame* within another quencheth not, but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would still ascend upwards in one greatnesse, if it were not quenched on the *Sides*: And the greater the *Flame* is at the *Bottome*, the higher is the *Rise*. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but onely remaineth contiguous; As it commeth to passe betwixt Consisting Bodies. It appeareth also, that the forme of a *Piramis* in *Flame*, which we usually see, is meere by Accident, and that the *Aire* about, by quenching the *Sides* of the *Flame*, crusheth it, and extenuateth it into that Forme; For of it selfe it would bee Round: And therefore *Smoake* is in the Figure of a *Piramis* Reuerfed; For the *Aire* quencheth the *Flame*, and receiveth the *Smoake*. Note also, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of Wine*, is troubled; And doth not onely open and moue vpwards, but moueth wauiing, and to and fro: As if *Flame* of his owne Nature (if it were not quenched) would rowle and turne, as well as move upwards. By all which it should seeme that the *Cælestiall* Bodies, (most of them) are true *Fires*, or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all Globular, and determinate; They haue Rotation; And they haue the Colour and Splendour of *Flame*: So that *Flame* about is Durable, and Consistent, and in his Naturall place; But with vs, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

Take an *Arrow*, and hold it in *Flame*, for the space of ten pulses; And when it commeth forth, you shall finde those Parts of the *Arrow*, which were on the *Outsides* of the *Flame*, more burned, blacked, and turned almost into a *Coale*; whereas that in the *Middest* of the *Flame*, will bee, as if the *Fire* had scarce touched it. This is an *Instance* of great consequence for the discovery of the Nature of *Flame*; And sheweth manifestly, that *Flame* burneth more violently towards the *Sides*, than in the *Middest*: And, which is more, that *Heat* or *Fire* is not violent or furious, but where it is checked and pent. And therefore the *Peripateticks* (howsoever their opinion of an *Element* of *Fire* about the *Aire* is iustly exploded;) in that Point they acquit themselves well: For being opposed, that if there were a *Sphere* of *Fire* that incompassed the *Earth* so neere hand, it were impossible but all things should be burnt up; They answer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

Experiment
Solitary touching the
Different force of
Flame in the
Middest and on
the Sides.

32

Experiment
Solitary touching the
Decrease of the
Naturall motion
of Gravity in
great distance
from the *Earth*,
or within some
depth of the
Earth.

It is affirmed constantly by many, as an usuall Experiment; That a *Lump* of *Fire* in the *Bottome* of a *Mine*, will be tumbled, and stirred, by two Mens strength; which if you bring it to the *Top* of the *Earth*, will aske Six Mens strength at the least to stirre it. It is a Noble *Instance*, and is fit to be tried to the full: For it is very probable, that the *Motion*

of Gravity worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Appetite of Union of Dense Bodies with the Earth, in respect of the distance, is more dull; The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the Morning to a *Point* or place (which was the Opinion of the *Ancients*) it is a meere Vanity.

Experiment
Solitary touch-
ing the Con-
traction of Bo-
dies in Bulk, by
the Mixture of
the more Li-
quid Body with
the more Solid.

34

IT is strange, how the *Ancients* tooke vp *Experiments* vpon credit; and yet did build great Matters vpon them. The Observation of some of the best of them, delivered confidently is, That *Vessell* filled with *Asbes* will receive the like quantity of *Water*, that it would haue done, if it had beene empty. But this is vtterly vnttrue; for the *Water* will not goe in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the *Asbes*; As wee see that *Asbes* alone, if they bee hard pressed, will lye in lesse roome: And so the *Asbes* with Aire betweene, lye looser; And with *Water*, closer. For I haue not yet found certainly, that the *Water*, it selfe, by mixture of *Asbes*, or *Dust*, will shrinke or draw into lesse Roome.

Experiment
Solitary touch-
ing the Ma-
king Vines more
fruitfull.

35

IT is reported of credit, that if you lay good store of *Kernels* of *Grapes*, about the *Root* of a *Vine*; it will make the *Vine* come earlier, and prosper better. It may bee tried with other *Kernels*, laid about the *Root* of a *Plant* of the same kinde; As *Figs*, *Kernels* of *Apples*, &c. The Cause may bee, for that the *Kernels* draw out of the Earth luice fit to nourish the *Tree*, as those that would bee *Trees* of themselves, though there were no *Root*; But the *Root* being of greater strength, robbeth and deuoureth the Nourishment, when they haue drawne it: As great *Fishes* deuoure little.

Experiments
in Confort
touching Pur-
ging Medicines.

36

THE Operation of *Purging Medicines*, and the Causes thereof, haue beene thought to be a great Secret; And so according to the slothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall Vertue*, and a *Fourth Quality*, And the like Shifts of Ignorance. The Causes of *Purging* are diuers; All plaine and perspicuous; And throughly maintained by Experience. The first is, That whatsoeuer cannot bee overcome and digested by the *Stomacke*, is by the *Stomacke*, either put vp by *Vomit*, or put downe to the *Guts*; And by that *Motion* of *Expulsion* in the *Stomacke*, and *Guts*, other *Parts of the Body* (as the *Orifices* of the *Veines*, and the like) are moued to expell by *Consent*. For nothing is more frequent than *Motion of Consent* in the Body of Man. This Surcharge of the *Stomacke*, is caused either by the *Quality* of the *Medicine*, or by the *Quantity*. The *Qualities* are three: *Extreme Bitter*, as in *Aloës*, *Coloquintida*, &c. *Loathsome* and of horrible taste; As in *Agarick*, *Blacke Hellebore*, &c. And of *secret Malignity*, and disagreement towards *Mans Body*, many times not appearing much in the Taste; As in *Scammony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine*, that

that *Purgeth*, and hath neither of the first two *Manifest Qualities*; it is to bee held suspected, as a kinde of *Poison*; For that it worketh either by *Corrosion*; Or by a *Secret Malignity* and Enmity to *Nature*: And therefore such *Medicines* are warily to be prepared, and vsed. The *Quantity* of that which is taken, doth also cause *Purging*; as wee see in a great *Quantity* of *New Milke* from the Cow; yea, and a great *Quantity* of *Meat*; For *Surfers* many times turne to *Purges*, both vpwards, and downwards. Therefore wee see generally, that the working of *Purging Medicines*, commeth two or three houres after the *Medicines* taken; For that the *Stomacke* first maketh a prooffe, whether it can concoct them. And the like happeneth after *Surfers*; Or *Milke* in too great *Quantity*.

A second Cause is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery Veines*; As it is scene, that *Salt*, or any such thing that is sharpe and biting, put into the *Fundament*, doth prouoke the *Part* to expell; And *Mustard* prouoketh *Sneezing*: And any sharpe Thing to the *Eyes*, prouoketh *Teares*. And therefore wee see that almost all *Purgers* haue a kinde of *Twitching* and *Vellication*, besides the *Gripping* which commeth of winde. And if this *Mordication* bee in an ouer-high Degree, it is little better than the *Corrosion* of *Poison*; And it commeth to passe sometimes in *Antimony*; Especially if it be giuen, to Bodies not repleat with *Humors*; For where *Humors* abound, the *Humors* saue the *Parts*.

The third Cause is *Attraction*: For I doe not deny, but that *Purging Medicines* haue in them a direct Force of *Attraction*; As *Drawing Plasters* haue in *Surgery*: And wee see *Sage*, or *Betony* brused, *Sneezing-powder*, and other *Powders* or *Liquors* (which the *Physicians* call *Errhines*), put into the *Nose*, draw *Flegme*, and water from the *Head*; And so it is in *Apophlegmatismes*, and *Gargarismes*, that draw the *Rheume* downe by the *Pallat*. And by this Vertue, no doubt, some *Purgers* draw more one *Humour*, and some another, according to the *Opinion* receiued: As *Rubarb* draweth *Choller*; *Sean* *Melancholy*; *Agaricke* *Flegme*; &c. But yet, (more or lesse) they draw promiscuously. And more also, that besides *Sympathy*, betwene the *Purger* and the *Humour*, there is also another Cause, why some *Medicines* draw some *Humour* more than another. And it is, for that some *Medicines* worke quicker than others: And they that draw quicke, draw onely the *Lighter*, and more fluide *Humours*; they that draw slow, worke vpon the more *Tough*, and *Viscous* *Humours*. And therefore Men must beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh onely the *Lightest* part of the *Humour* away, and leaueth the *Mass* of *Humours* more obstinate. And the like may bee said of *Worme-wood*, which is so much magnified.

The fourth Cause is *Flatuosity*: For *Wind* stirred moueth to expell: And wee finde that (in effect) all *Purgers* haue in them a raw *Spirit*, or *Winde* which is the *Principall Cause* of *Tortion* in the *Stomacke*, and *Belly*. And therefore *Purgers* leese (most of them) the Vertue, by *Decoction* vpon the *Fire*; And for that Cause are giuen chiefly in *Infusion*, *Iuyce*, or *Powder*.

The

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The fifth Cause is *Compression*, or *Crushing*: As when *Water* is Crushed out of a *Sponge*: So wee see that *Taking Cold* moueth Loosenesse by Contraction of the *Skinne*, and outward Parts; And so doth *Cold* likewise cause *Rheumes*, and *Defluxions* from the *Head*; And some *Astringent Plasters* crush out purulent Matter. This kinde of Operation is not found in many *Medicines*: *Mirabolanes* haue it; And it may bee the *Barkes of Peaches*; For this Vertue requireth an *Astriction*; but such an *Astriction* as is not gratefull to the *Body*: (For a pleasing *Astriction* doth rather Binde in the *Humours*, than Expell them :) And therefore such *Astriction* is found in Things of an *Hartish Taste*.

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The Sixth Cause is *Lubrefaction*, and *Relaxation*. As wee see in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallows*, *Lettuce*, *Mercuriall*, *Pelletory of the Wall*, and others. There is also a secret Vertue of *Relaxation* in *Cold*: For the *Heat* of the *Body* bindeth the Parts and *Humours* together, which *Cold* relaxeth: As it is seene in *Vrine*, *Bloud*, *Pottage*, or the like; which, if they bee *Cold*, breake and dissolue. And by this kinde of *Relaxation*, *Feare* looseth the *Belly*; because the *Heat* retiring inwards towards the *Heart*, the *Guts* and other Parts are relaxed; In the same manner, as *Feare* also causeth Trembling in the *Sinewes*. And of this Kinde of *Purgers*, are some *Medicines* made of *Mercury*.

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The Seuenth Cause is *Absterion*; which is plainly a *Scouring off*, or *Incision* of the more viscons *Humours*, and making the *Humors* more fluide; And Cutting betweene them, and the Part. As is found in *Nitrous Water*, which scoureth *Linnen Cloth* (speedily) from the *Foulenesse*. But this *Incision* must bee by a *Sharpnesse*, without *Astriction*; Which wee finde in *salt*, *Worme-wood*, *Oxymel*, and the like.

43

There bee *Medicines*, that moue *Stooles*, and not *Vrine*; Some other, *Vrine*, and not *Stooles*. Those that *Purge by Stooles* are such as enter not at all, or little into the *Mesentery Veines*; But either at the first are not digestible by the *Stomacke*, and therefore moue immediately downwards to the *Guts*; Or else are afterwards reiected by the *Mesentery Veines*, and so turne likewise downwards to the *Guts*; and of these two kinds are most *Purgers*. But those that moue *Vrine*, are such, as are well digested of the *Stomacke*, and well receiued also of the *Mesentery Veines*; So they come as farre as the *Liuier*, which sendeth *Vrine* to the *Bladder*, as the *Whye of Blood*: And those *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liuier*, in sending downe the wheyey Part of the *Blood* to the *Reines*. For *Medicines Vrinatine* doe not worke by Reiection, and Indigestion, as *Solutiue* doe.

44

There bee diuers *Medicines*, which in greater *Quantity*, moue *Stooles*, and in smaller, *Vrine*: And so contrariwise, some that in greater *Quantity*, moue *Vrine*, and in Smaller, *Stooles*. Of the former sort is *Rubarb*, and some others. The Cause is, for that *Rubarb* is a *Medicine*, which the *Stomacke* in a small *Quantity* doth digest, and ouercome, being not *Flatuous*, nor *Loathsome*; and so sendeth it to the *Mesentery Veines*; And so being opening, it helpeth downe *Vrine*: But in a greater *Quantity*, the

the *Stomacke* cannot overcome it, and so it goeth to the *Guts*. *Pepper* by some of the *Ancients* is noted to bee of the second sort ; which being in small *Quantity*. moueth winde in the *Stomacke* and *Guts*, and so expelleth by *Stoole* ; But being in greater *Quantity*, dissipateth the *Winde* ; And it selfe getteth to the *Mesentery Veines* ; And so to the *Liu*er, and *Reines* ; where, by Heating and Opening, it sendeth downe *Vrine* more plentifully.

WEE haue spoken of *Evacuating* of the *Body* ; we will now speake something of the *Filling* of it by *Restoratines* in *Consumptions*, and *Emaciating diseases*. In *Vegetables*, there is one part that is more Nourishing than another ; As *Graines*, and *Roots* nourish more, than the *Leaves* ; In so much as the *Order* of the *Foliatanes* was put downe by the *Pope*, as finding *Leaves* vnable to nourish mans *Body*. Whether there bee that difference in the *Flesh* of *Living Creatures*, is not well inquired : As whether *Liuers*, and other *Entrailes*, bee not more Nourishing, than the *Outward Flesh*. Vvee finde that amongst the *Romans*, a *Gooses Liuer* was a great *Delicacy* ; In so much as they had *Artificiall Meanes* to make it faire, and great ; But whether it were more Nourishing, appeareth not. It is certaine, that *Marrow* is more Nourishing than *Fat*. And I conceiue that some *Decoction* of *Bones*, and *Sinewes*, stamped, and well strained, would bee a very *Nourishing Broth* : We finde also that *Scotch Schinke*, (which is a Pottage of strong Nourishment) is made with the *Knees*, and *Sinewes* of *Beefe* : but long boiled : *Jelly* also, which they vse for a *Restorative*, is chiefly made of *Knuckles* of *Veale*. The *Pulpe* that is within the *Crashe* or *Crabb*, which they spice and butter, is more Nourishing than the *Flesh* of the *Crabb* or *Crashe*. The *Yolkes* of *Egges* are clearly more Nourishing than the *Whites*. So that it should seeme, that the *Parts* of *Living Creatures*, that lye more Inwards, nourish more than the *Outward Flesh* : Except it be the *Braine* ; which the *Spirit* prey too much vpon, to leaue it any great *Vertue* of Nourishing. It seemeth for the Nourishing of *Aged Men*, or *Men* in *Consumptions*, some such thing should bee *Deuised*, as should bee halfe *Chylus*, before it be put into the *Stomacke*.

Take two large *Capons* ; perboile them vpon a soft fire, by the space of an houre, or more, till in effect all the *Bloud* bee gone. Adde in the *Decoction* the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*, Cut off the *Shankes*, and throw them away. Then with a good strong *Chopping-knife*, Mince the two *Capons*, *Bones* and all, as small as ordinary *Minced Meat* ; Put them into a large neat *Boulter* ; Then take a *Kilderkin*, sweet, and well seasoned, of foure Gallons of *Beere*, of 8. *S.* strength, Now as it commeth from the *Tunning* ; Make in the *Kilderkin* a great *Bung-hole* of purpose : Then thrust into it, the *Boulter* (in which the *Capons* are) drawne out in length ; Let it steepe in it three *Dayes*, and three *Nights*, the *Bung-hole* open, to worke ; Then close the *Bung-hole*, and so let it continue, a *Day* and a halfe ; Then draw

Experiments.
in Confort touch-
ing Meats
and Drinks that
are most Nour-
ishing.

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draw it into Bottles, and you may drinke it well alter three dayes Bottelling; And it will last six weekes (approved.) It drinketh fresh, flowreth and mantleth exceedingly; It drinketh not newish at all; It is an excellent Drinke for a Consumption, to bee drinke either alone, or Carded with some other Beere. It quencherh Thirst, and hath no whit of windinesse. Note, that it is not possible, that Meat and Bread, either in Broths, or taken with Drinke, as is vsed, should get forth into the Veines, and outward Parts, so finely, and easly, as when it is thus incorporate, and made almost a *Chilus* aforehand.

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Triall would be made of the like Brew with *Potado Roots*, or *Burre Roots*; or the *Pith* of *Artichoakes*, which are nourishing Meats: It may bee tried also, with other flesh; As *Pheasant*, *Partridge*, *Young Porke*, *Pig*, *Venison*, especially of *Young Deere*, &c.

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A *Mortresse* made with the *Browne* of *Capons*, stamped, and strained, and mingled (after it is made) with like quantity, (at the least,) of *Almond Butter*; is an excellent Meat to Nourish those that are weake; Better than *Blanck-manjar*, or *Jelly*: And so is the *Cullice* of *Cockes*, Boiled thicke with the like mixture of *Almond Butter*: For the *Mortresse*, or *Cullice*, of it selfe, is more Savoury and strong; and not so fit for Nourishing of weake Bodies; But the *Almonds* that are not of so high a taste as *Flesh*, doe excellently qualifie it.

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Indian Maiz hath (of certaine) an excellent Spirit of Nourishment: But it must bee thorowly boyled, and made into a *Maiz-Cream* like a *Barley Cream*. I iudge the same of *Rize*, made into a Cream; For *Rize* is in *Turkey*, and other Countreys of the East, most fed vpon; But it must bee thorowly boyled in respect of the hardnesse of it: And also because otherwise it bindeth the Body too much.

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Pistachoes, so they bee good, and not Musty, ioyned with *Almonds* in *Almond Milke*; Or made into a *Milke* of themselves, like vnto *Almond Milke*, but more greene, are an excellent Nourisher. But you shall doe well, to adde a little *Ginger*, scraped, because they are not without some subtill windinesse.

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Milke warme from the Cow, is found to bee a great Nourisher, and a good Remedy in *Consumptions*: But then you must put into it, when you milke the Cow, two little bagges; the one of *Powder* of *Mint*, the other of *Powder* of *Red Roses*; For they keepe the *Milke* somewhat from Turning, or Crudling in the Stomack; And put in Sugar also for the same cause, and partly for the Tastes sake; But you must drinke a good draught that it may stay lesse time in the Stomack, lest it Crudle: And let the Cup into which you milke the Cow, be set in a greater Cup of hot Water, that you may take it warme. And *Cow-milke*, thus prepared, I iudge to be better for a *Consumption*, than *Asse-milke*, which (it is true) turneth not so easly, but it is a little harrish; Marry it is more proper for Sharpnesse of *Vrine*, and Exulceration of the Bladder, and all manner of Lenifyings. *Womans Milke* likewise is prescribed, when all faile; but I commend it not; as being a little too neere the Iuyce of Mans

Mans Body, to be a good Nourisher; Except it be in *Infants*, to whom it is Naturall.

Oyle of Sweet Almonds, newly drawne, with *Sugar*, and a little *Spice*, spread vpon Bread toasted, is an Excellent Nourisher; But then to keepe the *Oyle* from fying in the Stomacke, you must drinke a good draught of *Milde Beere* after it; And to keepe it from relaxing the Stomacke too much, you must put in a little Powder of *Cinnamon*.

The *Tolkes of Egges* are of themselves so well prepared by Nature for Nourishment; As (so they bee Potched, or Reare boiled) they need no other Preparation, or Mixture: yet they may bee taken also raw, when they are new laid, with *Malmesey*, or *Sweet wine*; You shall doe well to put in some few Slices of *Eryngium Roots*, and a little *Amber-grice*; For by this meanes, besides the immediat Faculty of Nourishment, such Drinke will strengthen the Backe; So that it will not draw downe the *Vrine* too fast; For too much *Vrine* doth alwayes hinder Nourishment.

Mincing of meat, as in *Pies*, and *Buttered Minced Meat*, saue the Grinding of the Teeth; And therefore, (no doubt) it is more Nourishing; Especially in Age; Or to them that haue weake Teeth; But the Butter is not so proper for weake Bodies; And therefore it were good to moisten it with a little *Claret wine*, Pill of *Limon*, or *Orange*, cut small, *Sugar*, and a very little *Cinnamon*, or *Nutmegg*. As for *Chuncts*, which are likewise minced Meat, in stead of Butter, and Fat, it were good to moisten them, partly with *Creame*, or *Almond*, or *Pistacho Milke*, or *Barley*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* wee referue to the due place.

Wee haue hitherto handled the Particulars which yeeld best, and easiest, and plentifullest Nourishment; And now we will speake of the best Meanes of Conueying, and Conuerting the Nourishment.

The First *Meanes* is, to procure that the *Nourishment* may not bee robbed, and drawne away; wherein that, which wee haue already said, is very Materiall; To prouide, that the *Reines* draw not too strongly an ouer-great Part of the *Bloud* into *Vrine*. To this adde that Precept of *Aristotle*, that *Wine* be forborne in all *Consumptions*; For that the *Spirits of the wine*, doe prey vpon the Roscide luyce of the Body, and inter-comimon with the *Spirits of the Body*, and so deceiue and rob them of their Nourishment. And therefore if the *Consumption* growing from the weaknesse of the Stomacke, doe force you to vse *wine*; let it alwayes be burnt, that the *Quicker Spirits* may euaporate; or at the least quenched with two little wedges of *Gold*, six or seuen times repeated. Adde also this Prouision; That there bee not too much *Expence* of the *Nourishment*, by *Exhaling* and *Sweating*: And therefore if the Patient be apt to sweat, it must bee gently restrained. But chiefly *Hippocrates* Rule is to bee followed; who aduiseeth quite contrary to that which is in vse: Namely, that the *Linens*, or *Garments* next the *Flesh*, bee in *Winter* drie, and oft changed;

changed; And in Sommer seldome changed, and smeared over with Oyle; For certaine it is, that any Substance that is Fat, doth a little fill the Proes of the Body, and stay Sweat, in some Degree. But the more cleanly way is to haue the *Linnen* smeared lightly ouer, with Oyle of *Sweet Almonds*; And not to forbear shifting as oft as is fit.

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The second *Meanes* is, to send forth the *Nourishment* into the *Parts*, more strongly; For which, the working must bee by *Strengthening* of the *Stomack*; And in this, because the *Stomacke* is chiefly comforted by *Wine*, and *Hot things*, which otherwise hurt; it is good to resort to *Outward Applications* to the *Stomacke*: Wherein it hath bene tried, that the *Quills* of *Roses*, *Spices*, *Masticke*, *worme-wood*, *Mint*, &c. are nothing so helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sacke*, or *Alegant*; And to dry it; And after it bee dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the *Stomacke*: For it is certaine that al| Flower hath a potent Vertue of *Astriction*; In so much as it hardneth a peece of flesh, or a Flower, that is laid in it: And therefore a *Bagge* quilted with *Bran*, is likewise very good; but it drieth somewhat too much; And therefore it must not lye long.

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The third *Meanes*, (which may bee a Branch of the former) is to send forth the *Nourishment* the better by *Sleepe*. For wee see, that Beares, and other *Creatures* that *Sleepe* in the Winter wax exceeding Fat: And certaine it is, (as it is commonly beleueed) that *Sleepe* doth Nourish much; Both for that the Spirits doe lesse spend the Nourishment in *Sleepe*, than when liuing *Creatures* are awake: And because (that which is to the present purpose) it helpeth to thrust out the Nourishment into the *Parts*. Therefore in Aged men, and weake Bodies, and such as abound not with Choller, a short *Sleepe* after dinner doth helpe to Nourish; For in such Bodies there is no feare of an ouer-hasty Digestion, which is the Inconuenience of Postmeridian *Sheepes*. *Sleepe* also in the Morning, after the taking of somewhat of easie Digestion; As *Milke* from the Cow, *Nourishing Broth*, or the like; doth further Nourishment: But this would be done, sitting vpright, that the *Milke* or *Broth* may passe the more speedily to the Bottome of the *Stomacke*.

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The Fourth *Meanes* is to provide that the *Parts* themselves may draw to them the Nourishment strongly. There is an Excellent Observation of *Aristotle*; That a great Reason, why Plants (some of them) are of greater Age, than *Liuing Creatures*, is, for that they yearely put forth new Leaues and Boughes; Whereas *Liuing Creatures* put forth (after their Period of Growth,) nothing that is young, but Haire and Nails which are Excrements, and no *Parts*. And it is more certaine, that whatsoever is Young, doth draw Nourishment better, than that which is Old; And then (that which is the Mystery of that Observation) Young *Boughes*, and *Leaues*, calling the Sap vp to them; the same Nourisheth the *Body*, in the Passage. And this wee see notably proued also, in that the oft Cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Lasting. Transferrre therefore this Observation to the Helping

Helping of Nourishment in *Living Creatures*: The Noblest and Principall Vse whereof is, for the *Prolongation of Life*; *Restauration* of some Degree of *Tough*; and *Inteneration* of the *Parts*: For certaine it is, that there are in *Living Creatures* Parts that Nourish, and repaire Easily; And Parts that Nourish and repaire hardly, And you must refresh, and renew those that are easie to Nourish, that the other may bee refreshed, and (as it were) Drinke in Nourishment in the Passage. Now we see that *Draught Oxen*, put into good Pasture, recouer the Flesh of young Beeffe; And Men after long Emaciating Diets, wax plump, and fat, and almost New: So that you may surely conclude, that the frequent and wise Vse of those *Emaciating Diets*, and of *Purgings*: And perhaps of some kinde of *Bleeding*; is a principall Meanes of *Prolongation of Life*; And *Restoring* some Degree of *Tough*: For as we haue often said, *Death* commeth vpon *Living Creatures* like the Torment of *Mezentius*.

Mortua quiescunt inuicem Corpora uiuis.

Componens Manibusq; Manus, atq; Oribus Ora.

For the Parts in Mans Body easily reparable (as *Spirits*, *Bloud*, and *Flesh*) die in the Embracement of the Parts hardly reparable (as *Bones*, *Nerves*, and *Membranes*;) and likewise some *Entrailes* (which they reckon amongst the *Spermatick Parts*;) are hard to repaire: though that Diuision of *Spermatick*, and *Menstruall Parts*, be but a Conceit. And this same *Observation* also may be drawne to the present purpose of Nourishing Emaciated Bodies: And therefore *Gentle Friction* draweth forth the Nourishment, by making the Parts a little hungry, and heating them; whereby they call forth Nourishment the better. This *Friction* I wish to bee done in the Morning. It is also best done by the *Hand*, or a peece of *Scarlet Wooll*, wet a little with *Oyle of Almonds*, mingled with a small Quantity of *Bay-salt*, or *Saffron*. We see that the very Currying of Horses doth make them fat, and in good liking.

The Fifth Meanes is, to further the very *Art of Assimilation* of *Nourishment*; which is done by some outward *Emollients*, that make the Parts more apt to *Assimilate*. For which I haue compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide* the *Receit*. The vse of it would bee betweene Sleepes; For in the latter Sleepe the Parts assimilate chiefly.

Here bee many *Medicines*, which by themselves would doe no Cure; but perhaps Hurt; But being applied in a certaine Order, one after another, doe great Cures. I haue tried (my selfe) a *Remedy* for the *Gout*, which hath seldome failed, but driuen it away in 24. Houres space: It is first to apply a *Pulasse*, of which *vide* the *Receit*; And then a *Bath* or *Fomentation*, of which *vide* the *Receit*; And then a *Plaster*, *vide* the *Receit*. The *Pulasse* relaxeth the Pores, and maketh the Humour apt to Exhale The *Fomentation* calleth forth the Humour by Vapours; But yet in regard of the way made by the *Pulasse*, draweth gently; And therefore draweth the Humour out; and doth not draw more to it; For it

C

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Experiment
Solitary touching
Filum
Medicinale.

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is a *Gentle Fomentation*, and hath withall a Mixture (though very little) of some *Stupetactive*. The *Plaster* is a Moderate *Astringent Plaster*, which repelleth New Humour from falling. The *Pultasse* alone would make the Part more soft, and weake; And apter to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pultasse*, would draw forth little; if too strong, it would draw to the Part, as well as draw from it. The *Plaster* alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The *Pultasse* is to be laid to for two or three Houres: The *Fomentation* for a Quarter of an Houre, or somewhat better, being vsed hot, and seuen or eight times repeated: The *Plaster* to continue on still, till the Part be well confirmed.

Experiment
Solitary touching Cure by
Custome.

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Here is a secret Way of Cure (vnpractised;) By *Assuetude* of that which in it selfe hurteth. *Poisons* haue been made, by some, Familiar, as hath beene said; *Ordinary keepers* of the *Sicke* of the *Plague*, are seldom infected. *Enduring of Torture*, by *Custome*, hath beene made more easie: The *Brooking* of Enormous *Quantity* of *Meats*, and so of *wine* or *Strong Drinke*, hath beene, by *Custome*, made to bee without *Surfet*, or *Drunkennesse*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthisickes*, some kindes of *Palsies*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Disease* be Incurable; Or whether the Iust Cure of it bee not full of perill; And if hee finde it to be such, let him resort to *Palliation*; And alleuiate the *Symptome*, without busying himselfe too much with the perfect Cure: And many times, (if the *Patient* bee indeed patient) that Course will exceed all Expectation. Likewise the *Patient* himselfe may strue, by little and little to Overcome the *Symptome*, in the Exacerbation, and so, by time, turne Suffering into Nature.

Experiment
Solitary touching Cure by
Excesse.

62

Diuers *Diseases*, especially *Chronicall* (such as *Quartan Agnes*;) are sometimes cured by *Surfet*, and *Excesses*; As *Excesse of Meate*, *Excesse of Drinke*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lassitude*, and the like. The Cause is, for that *Diseases* of *Continuance* get an *Aduentitious Strength* from *Custome*, besides their *Materiall Cause* from the *Humours*: So that the *Breaking* of the *Custome* doth leaue them onely to their first Cause; which if it be any thing weake will fall off. Besides, such *Excesses* doe Excite and Spur *Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment
Solitary touching Cure by
Motion of Consent.

63

Here is in the Body of Man a great *Consent* in the Motion of the seuerall Parts. Wee see, it is Childrens sport, to proue whether they can rub vpon their Breast with one hand, and pat vpon their Fore-head with another; And straight-ways, they shall sometimes rub with both Hands, or pat with both Hands. Wee see, that when the Spirits, that come to the Nostrils, expell a bad Sent, the Stomacke is ready to Expell

pell by Vomit. We finde that in *Consumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they dye. So in *Pestilens Diseases*, if they cannot bee expelled by *Sweat*, they fall likewise into *Loosenesse*, and that is commonly Mortall. Therefore *Physicians* should ingeniously contriue, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Consens*; As by the *Stench* of *Feathers*, or the like, they cure the *Rising* of the *Mother*.

Hippocrates *Aphorisme*, In *Morbis minus*, is a good profound *Aphorisme*, It importeth, that *Diseases*, contrary to the *Complexion*, *Age*, *Sex*, *Season of the yeare*, *Diet*, &c. are more dangerous, than those that are Concurrent. A man would thinke it should bee otherwise; For that, when the *Accident of Sicknesse*, and the *Naturall Disposition*, doe second the one the other, the *Disease* should bee more forcible: And so (no doubt) it is; if you suppose like *Quantity of Matter*. But that, which maketh good the *Aphorisme*, is; Because such *Diseases* doe shew a greater *Collection of Matter*, by that they are able to overcome those *Naturall Inclinations* to the Contrary. And therefore in *Diseases* of that kinde, let the *Physiion* apply himselfe more to *Purgation*, than to *Alteration*; Because the Offence is in the *Quantity*; and the *Qualities* are rectified of themselves.

Physicians doe wisely prescribe, that there bee *Preparatiues* vsed before *Inst Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body bee not accommodated, both before and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Sticking of the Humours, and their not comming faire away; Which causeth in the Body great Perturbations, and ill Accidents, during the *Purging*; And also, the diminishing, and dulling of the Working of the *Medicine* it selfe, that it purgeth not sufficiently. Therefore the worke of *Preparation* is double; To make the *Humours* *Fluide*, and mature; And to make the *Passages* more open; For both those helpe to make the Humours passe readily. And for the former of these, *Syrups* are most profitable; And for the Latter, *Apozumes*, or *Preparing Broths*; *Clifters* also helpe, lest the *Medicine* stop in the Guts, and worke gripingly. But it is true, that *Bodies abounding with Humours*, And *Fat Bodies*; And *Open Weather*; are *Preparatiues* in themselves; because they make the Humours more fluide. But let a *Physician* beware, how hee purge after hard *Frosty weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is caused by the Lodging of some *Humours* in ill Places: For it is certaine, that there bee *Humours*, which somewhere placed in the Body, are quiet, and doe little hurt; In other Places (especially *Passages*) doe much mischief. Therefore it is good, after *Purging*, to vse *Apozumes*, and *Broths*, not so much *Opening* as those vsed before *Purging*, but *Abstersive* and

Experiment
Solitary tou-
ching Cure of
Diseases which
are contrary to
Predisposition.

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Experiment
Solitary tou-
ching Prepara-
tions before
Purging, and
settling of the
Body afterward.

65

Mundifying Clifters also are good to conclude with, to draw away the Reliques of the Humours, that may haue descended to the *Lower Region* of the *Body*.

Experiment
Solitary touch-
ing Stanch-
ing of Bloud.

66

Blood is stanch'd diuers wayes. First, by *Astringents*, and *Repercussive Medicines*. Secondly, by *Drawing* of the *Spirits* and *Blond* inwards; which is done by *Cold*; As *Iron*, or a *Stone* laid to the necke doth stanch the Bleeding at the Nose; Also it hath beene tried, that the *Testicles*, being put into sharpe Vinegar, hath made a sudden Receffe of the *Spirits*, and stanch'd *Bloud*. Thirdly, by the *Receffe of the Blond* by *Sympathy*. So it hath beene tried, that the part that bleedeth, being thrust into the Body of a Capon, or Sheepe, new ript and bleeding, hath stanch'd *Blond*; The *Blond*, as it seemeth, sucking and drawing vp, by similitude of substance, the *Blond* it meeth with, and so it selfe going backe. Fourthly by *Custom* and *Time*; So the Prince of *Aurange*, in his first hurt, by the *Spanish Boy*, could finde no meanes to stanch the *Blond*, either by *Medicine* or *Ligament*; but was faine to haue the *Orifice* of the wound stopped by *Mens Thumbs*, succeeding one another, for the space at least of two Dayes; And at the last the bloud by *Custom* only retired. There is a fifth Way also in vse, to let *Blond* in an *Aduerse Part*, for a *Reuulsion*.

Experiment
Solitary touch-
ing Change of
Aliments and
Medicines.

67

IT helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the same *Medicine*, and *Aliment* still. The Cause is, for that *Nature* by continuall Vse of any Thing, groweth to a *Satiety*, and *Dulnesse*, either of *Appetise*, or *Working*. And we see that *Assuetude* of *Things Hurtfull* doth make them leese their force to Hurt; As *Poison*, which with vse some haue brought themselves to brooke. And therefore it is no maruell, though *Things helpfull*, by *Custom*, leese their force to helpe. I count *Intermission* almost the same thing with *Change*; For that, that hath beene intermitted, is after a sort new.

Experiment
Solitary touch-
ing Diets.

68

IT is found by Experience, that in *Diets of Guaiacum*, *Sarza*, and the like (especially if they bee strict) the *Patient* is more troubled in the beginning, than after continuance; which hath made some of the more delicate Sort of Patients, giue them ouer in the midst; Supposing that if those Diets trouble them so much at first, they shall not be able to endure them to the End. But the Cause is, for that all those *Diets* doe dry vp *Humours*, *Rheumes*, and the like; And they cannot Dry vp vntill they haue first attenuated; And while the *Humour* is attenuated, it is more Fluid, than it was before, and troubleth the Body a great deale more, untill it bee dried vp, and consumed. And therefore *Pacientes* must expect a due time, and not checke at them at the first.

Experiments
in Consort
touching the
Production of
Cold.

The Producing of Cold is a thing very worthy the Inquisition; both for Vse, and Disclosure of Causes. For Heat and Cold

Cold are *Natures* two Hands, whereby thee chiefly worketh : And *Heat* we haue in readinesse, in respect of the *Fire* ; But for *Cold* wee must stay till it commeth ; or seeke it in deepe *Cauces*, or high *Mountaines*, And when all is done, we cannot obtaine it in any great degree : For *Furnaces* of *Fire* are farre hotter, than a *Summers Sunne* ; But *Vaults*, or *Hils* are not much Colder than a *Winters Frost*.

The first *Meanes* of *Producing Cold*, is that which *Nature* presenteth vs withall ; Namely the *Expiring of Cold* out of the *Inward parts of the Earth* in *winter*, when the *Sunne* hath no power to ouercome it ; the *Earth* being (as hath beene noted by some) *Primum Frigidum*. This hath beene asserted as well by Ancient as by Moderne *Philosophers* : It was the Tenet of *Parmenides*. It was the opinion of the *Author* of the discourse in *Plutarch* (for I take it that Booke was not *Plutarchs* owne) *De primo Frigido*. It was the opinion of *Telestus*, who hath renewed the *Philosophy* of *Parmenides*, and is the best of the *Nouellists*.

The Second *Cause* of *Cold* is the *Contact* of *Cold Bodies* ; For *Cold* is *Actiue* and *Transitiue* into *Bodies* *Adiacent*, as well as *Heat* : which is seene in those things that are touched with *Snow* or *Cold water*. And therefore whosoever will be an *Inquirer* into *Nature*, let him resort to a *Conservatory* of *Snow* and *Ice* ; Such as they use for delicacy, to coole *Wine* in *Summer* : which is a Poore and Contemptible vse, in respect of other vses, that may be made of such *Conservatories*.

The Third *Cause* is the *Primary Nature* of all *Tangible bodies* : For it is well to be noted, that all Things whatsoever (*Tangible*) are of themselves *Cold* ; Except they haue an Accessory *Heat* by *fire* ; *Life* ; or *Motion* : For euen the *Spirit* of *wine*, or *Chymicall Oiles*, which are so hot in Operation, are to the first Touch *Cold* ; And *Aire* it selfe compressed, and Condensed a little by blowing, is *Cold*.

The Fourth *Cause* is the *Density of the Body* ; For all *Dense Bodies* are *Colder* than most other *Bodies* ; As *Metalls*, *Stone*, *Glasse* ; And they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth*, *Dense*, *Tangible*, hold all of the Nature of *Cold*. The Cause is, for that all *Matters Tangible* being *Cold*, it must needs follow, that where the *Matter* is most Congregate, the *Cold* is the greater.

The Fifth *Cause* of *Cold*, or rather of increase and vehemence of *Cold*, is a *Quicke Spirit* inclosed in a *Cold Body* : As will appeare to any that shall attentiuely consider of *Nature* in many Instances. Wee see *Nitre* (which hath a *Quicke Spirit*) is *Cold* ; more *Cold* to the Tongue, than a *Stone* ; So *Water* is *Colder* than *Oile*, because it hath a *Quicker Spirit* ; For all *Oile*, though it hath the *Tangible Parts* better digested than *Water*, yet hath it a duller *Spirit* : So *Snow* is *Colder* than *Water*, because it hath more *Spirit* within it : So we see that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice*) increaseth the *Actiue* of *Cold* : So some *Insecta* which haue

Spirit of Life, as *Snakes*, and *Silkwormes*, are, to the touch *Cold*. So *Quick-silver* is the *Coldest* of *Mettals*, because it is *fullest of Spirit*.

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The *Sixth Cause of Cold* is the *Chasing and Driving away of Spirits*, such as haue some *Degree of Heat*: For the *Banishing of the Heat* must needs leaue any *Body Cold*. This wee see in the *Operation of Opium*, and *Stenopaeactives*, vpon the *Spirits of liuing Creatures*: And it were not amisse to try *Opium*, by laying it vpon the *Top of a weather-Glasse*, to see whether it will contract the *Aire*: But I doubt it will not succeed: For besides that the *Vertue of Opium* will hardly penetrate thorow such a *Body as Glasse*, I conceive that *Opium*, and the like, make the *Spirits* flye rather by *Malignity*, than by *Cold*.

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Seuenthly, the same *Effect* must follow vpon the *Exhaling* or *Drawing out of the warme Spirits*, that doth vpon the *Flight of the Spirits*. There is an *Opinion*, that the *Moone* is *Magneticall of Heat*, as the *Sunne* is of *Cold* and *Moisture*: It were not amisse therefore to try it, with *Warme-waters*; The one exposed to the *Beames of the Moone*; the other with some *Skreene* betwixt the *Beames of the Moone* and the *water*; As wee vse to the *Sunne* for *Shade*; And to see whether the former will coole sooner. And it were also good to enquire, what other *Meanes* there may bee, to draw forth the *Exile Heat*, which is in the *Aire*, for that may be a *Secret of great Power* to Produce *Cold weather*.

Experiments
in Consort
touching the
Version and
Transmutation
of Aire into
water.

Wee haue formerly set downe the *Meanes of turning Aire into water*, in the *Experiment 27*. But because it is *Magnale Naturæ*; And tendeth to the *subduing of a very great effect*; And is also of *Manifold vse*; wee will adde some *Instances in Consort* that giue light thereunto.

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It is reported by some of the *Ancients*, that *Sailers* haue vsed, every *Night*, to hang *Fleeces of Wooll* on the *sides of their Ships*, the *Wooll* towards the *water*; And that they haue crushed fresh *Water* out of them, in the *Morning*, for their vse. And thus much we haue tried, that a *Quantity of wooll* tied loose together, being let downe into a *deepe well*; And hanging in the *Middle*, some three *Fathome* from the *Water*, for a *night*, in the *Winter time*; increased in weight, (as I now remember) to a *fifth Part*.

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It is reported by one of the *Ancients*, that in *Lydia*. neere *Pergamus*, there were certaine *worke-men*, in time of *Warres*, fled into *Caues*; And the *Mouth of the Caues* being stopped by the *Enemies*, they were famished. But long time after the *dead Bones* were found; And some *Vessels* which they had carried with them; And the *Vessels full of Water*; And that *water*, thicker, and more towards *Ice*, than *Common Water*: which is a *Notable Instance of Condensation*, and *Induration*, by *Buriall vnder Earth*, (in *Caues*) for long time; And of *version* also (as it should seeme) of *Aire* into *Water*; if any of those *Vessels* were *Empty*. Try therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like

like in *Quick-silver*: And if you finde the *Bladders* fallen, or shrunk; you may be sure the *Aire* is condensed by the *Cold* of those *Bodies*; As it would be in a *Cave* vnder *Earth*.

It is reported of very good credit, that in the *East Indies*, if you set a Tub of *water* open, in a Roome where *Cloues* are kept, it will bee drawne dry in foure and twenty houres; Though it stand at some distance from the *Cloues*. In the Countrey, they vse many times, in deceit, when their *wooll* is new shorne, to set some *Pail*es of *water* by, in the same Roome; to increase the weight of the *wooll*: But it may bee, that the Heat of the *Wooll*, remaining from the body of the *Sheepe*; or the Heat gathered by the lying close of the *Wooll*, helpeth to draw the watry Vapour; But that is nothing to the *Version*.

It is reported also credibly, that *Wooll* new shorne, being laid casually vpon a *Vessell* of *Veriuyce*, after some time, had drunke vp a great part of the *Veriuyce*, though the *Vessell* were whole without any *Flaw*, and had not the Bung-hole open. In this instance, there is (vpon the by) to be noted the *Percolation*, or *Suing* of the *Veriuyce* thorow the wood; For *Veriuyce* of it selfe would neuer haue passed thorow the Wood; So as it seemeth, it must be first in a kinde of Vapour, before it passe.

It is especially to be noted, that the Cause, that doth facilitate the *Version* of *Aire* into *water*, when the *Aire* is not in grosse, but subtilly mingled with *Tangible Bodies*, is, (as hath beene partly touched before,) for that *Tangible Bodies* haue an Antipathy with *Aire*; And if they finde any *Liquid Body*, that is more dense, neere them, they will draw it: And after they haue drawne it, they will condense it more and in effect incorporate it; For wee see that a *Sponge*, or *wooll*, or *Sugar*, or a *woollen Cloth*, being put but in part, in *water*, or *wine*, will draw the *Liquor* higher, and beyond the place, where the *water* or *wine* cometh. Wee see also, that *wood*, *Lute-strings*, and the like, doe swell in *moist Seasons*: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth* of *Boxes*, and *Opening* of *wainscot doores*; which is a kinde of *Infusion*: And is much like to an *Infusion* in *water*, which will make wood to smell: As wee see in the *Filling* of the *Chops* of *Boules*, by laying them in *Water*. But for that part of these *Experiments*, which concerneth *Attraction*; wee will reserue it to the proper Title of *Attraction*.

There is also a *Version* of *Aire* into *water*, seene in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before and in moist weather: This must be, either by some *Moisture* the Body yeeldeth; Or else by the Moist *Aire* thickned against the hard body. But it is plaine, that it is the latter; For that wee see *Wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *wood* alone: which is caused by the Smoothnesse and Closenesse: which letteth in no part of the Vapour, and so turneth it backe, and thickeneth it into Dew. Wee see also, that *Breathing* vpon a *Glasse*, or Smooth body, giueth a Dew. And in *Frosty Mornings* (such as we call *Rime Frosts*) you shall finde drops of Dew vpon the

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the Inside of Glasse-windowes ; And the *Frost* it selfe vpon the ground is but a *Version* or *Condensation*, of the Moist Vapours of the Night, into a watry substance : *Dewes* likewise, and *Raine*, are but the Returnes of Moist Vapours Condensed ; The Dew, by the *Cold* onely of the Sunnes departure, which is the gentler *Cold* ; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire* ; which is the more violent *Cold*.

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It is is very probable (as hath beene touched) that that, which will turne *Water* into *Ice*, will likewise turne *Aire* Some Degree nearer vnto *Water*. Therefore try the *Experiment* of the *Artificiall Turning Water into Ice* (whereof we shall speake in another place) with *Aire* in place of *Water* and the *Ice* about it. And although it be a greater Alteration to turne *Aire* into *Water*, than *Water* into *Ice* : yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow ; For that *Artificiall Conversion* of *Water* into *Ice*, is the worke of a few Houres ; And this of *Aire* may be tried by a Moneths space, or the like.

Experiments
in Consort
touching Indu-
ration of Bodies.

Induration, or *Lapidification*, of Substances more soft, is likewise another degree of *Condensation* ; And is a great *Alteration* in Nature. The effecting and Accelerating thereof is very worthy to bee inquired. It is effected by three Meanes. The first is by *Cold* ; whose Property is to *Condense*, and constringe, as hath beene said. The Second is by *Heat* ; which is not proper but by consequence ; For the *Heat* doth attenuate ; And by Attenuation doth send forth the Spirit and moister Part of a Body ; And vpon that, the more grosse of the Tangible Parts doe contract and serre themselues together, Both to auoid *Vacuum* (as they call it ;) And also to Munite themselues against the Force of the *Fire*, which they haue suffered. And the third is by *Assimilation* ; when a Hard Body Assimilateth a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiscuously, are many : As the Generation of *Stones* within the Earth, which at the first are but Rude Earth, or Clay : And so of *Mineralls*, which come (no doubt) at first, of Iuyces Concrete, which after ward indurate : And so of *Porcellane*, Which is an *Artificiall Cement*, buried in the earth a long time : And so the Making of *Bricke*, and *Tile* : Also the Making of *Glasse*, of a certaine Sand, and Brake-Roots, and some other Matters : Also the *Exudations* of *Rock-Diamonds*, and *Crystall*, which harden

den with time : Also the *Induration* of *Bead-Amber*, which at first is a soft Substance ; as appeareth by the *Flies*, and *Spiders*, which are found in it ; And many more : But We will speake of them distinctly.

For *Indurations* by *Cold*, there be few Trials of it ; For we haue no strong or intense *Cold* here on the Surface of the *Earth*, so neere the Beames of the Sunne, and the Heauens. The likeliest Triall is by *Snow*, and *Ice* ; For as *Snow* and *Ice*, especially being holpen, and their *Cold* actuated by *Nitre*, or *Salt*, will turne *water* into *Ice*, and that in a few houres ; So it may bee, it will turne *wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conseruing Pit* of *Snow*, and *Ice*, (adding some quantity of *Salt*, and *Nitre*,) a Peece of *wood*, or a Peece of *Tough Clay*, and let it lye a Moneth, or more.

Another Triall is by *Metalline waters*, which haue vertuall *Cold* in them. Put therefore *Wood*, or *Clay*, into *Smiths Water*, or other *Metalline Water* ; And try whether it will not harden in some reasonable time. But I vnderstand it, of *Metalline waters*, that come by *Washing*, or *Quenching* ; And not of *Strong waters* that come by dissolution ; for they are too Corrosiue to consolidate.

It is already found, that there are some *Naturall Spring-waters*, that will Inlapidate *wood* ; So as you shall see one peece of *wood*, whereof the Part about the *Water* shall continue *Wood* ; and the Part vnder the *Water* shall be turned into a kinde of *Gravelly Stone* ; It is likely those *Waters* are of some *Metalline Mixture* ; But there would bee more particular inquiry made of them. It is certaine that an *EGGE* was found, hauing lien many yeares in the bottome of a Moat, where the *Earth* had somewhat ouergrowne it ; And this *EGGE* was come to the Hardnesse of a *Stone* ; And had the Colours of the white and yolke perfect : And the Shell shining in small graines like *Sugar*, or *Alabaster*.

Another Experience there is of *Induration* by *Cold*, which is already found ; which is, that *Metalls*, themselues are hardned by often *Heating* and *Quenching* in *Cold Water* : For *Cold* euer worketh most potently vpon *Heat* precedent.

For *Induration* by *Heat*, it must be considered, that *Heat*, by the Exhaling of the Moist Parts, doth either harden the Body ; As in *Bricks*, *Tiles*, &c. Or if the *Heat* bee more fierce, maketh the grosser part it selfe ; Run and Melt ; As in the making of ordinary *Glasse* ; And in the *Vitrification* of *Earth*, (As wee see in the inner Parts of *Furnaces* ;) and in the *Vitrification* of *Brick* ; And of *Metalls*. And in the former of these, which is the hardning by baking, without Melting, the *Heat* hath these degrees ; First, it *Indurath* ; And then maketh *Fragile* ; And lastly it doth *Incinerate* and *Calcinate*.

But if you desire to make an *Induration* with *Toughnesse*, and lesse Fragility ; A middle way would be taken ; Which is that which *Aristotle* hath well noted ; But would bee thoroughly verified. It is to decoct *Bodies*

in

in *water*, for two or three dayes ; But they must bee such Bodies, into which the *water* will not enter ; As *Stone*, and *Metall*. For if they be Bodies into which the *water* will enter, then long Seething, will rather Soften than indurate them. As hath beene tried in *Egges*, &c. Therefore, Softer *Bodies* must be put into Bottles ; And the Bottles hung into *Water* seething, with the mouthes open, aboue the *water* ; that no *water* may get in ; For by this Meanes, the vertuall *Heat* of the *water* will enter ; And such a *Heat*, as will not make the Body aduft, or fragile ; But the Substance of the *Water* will be shut out. This *Experiment* wee made ; And it sorted thus. It was tried with a Peece of *Free-stone*, and with *Pewter*, put into the *water* at large. The *Free-stone* wee found receiued in some *Water* ; For it was softer, and easier to scrape, than a peece of the same *Stone* kept dry. But the *Pewter* into which no *Water* could enter, became more white, and liker to *Siluer*, and lesse flexible, by much. There were also put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Peece of *Cheese*, a Peece of *Chalke*, and a Peece of *Free-stone*. The *Clay* came forth almost of the Hardnesse of *Stone*. The *Cheese* likewise very hard, and not well to bee cut : The *Chalke* and the *Free-stone* much harder than they were. The colour of the *Clay* inclined not a whit to the Colour of *Bricke*, but rather to *White*, as in ordinary Drying by the Sunne. Note, that all the former *Trialls* were made by a Boyling vpon a good hot Fire, renewing the *water* as it consumed, with other hot *water* ; But the Boyling was but for twelue houres onely ; And it is like that the *Experiment* would haue beene more effectuall, if the Boyling had beene for two or three dayes, as we prescribed before.

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As touching *Assimilation*, (for there is a degree of *Assimilation* euen in Inanimate Bodies) wee see examples of it in some *Stones* in *Clay-grounds*, lying neere to the top of the Earth, where *Pebble* is ; In which you may manifestly see diuers *Pebbles* gathered together, and a Crust of *Cement* or *Stone* betweene them, as hard as the *Pebbles* themselves : And it were good to make a *Triall* of purpose, by taking *Clay*, and putting in it diuers *Pebble-stones*, thicke set, to see whether in continuance of time, it will not be harder than other *Clay* of the same lumpe, in which no *Pebbles* are set. We see also in Ruines of old Walls, especially towards the Bottom, the *Mortar* will become as hard as the *Bricke* ; wee see also, that the *Wood* on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar*, harder than the *Wood* it selfe ; And Scales likewise grow to the *Teeth*, harder than the *Teeth* themselves.

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Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees* and *Lining Creatures*. For no Nourishment that the *Tree* receiueth, or that the *Lining Creature* receiueth, is so hard as *Wood*, *Bone*, or *Horne*, &c. but is *Indurated* after by *Assimilation*.

Experiment
Solitary touching the
Per-
sion of *Water* in-
to *Aire*.

91

THE eye of the vnderstanding, is like the eye of the Sense: For as you may see great Obiects thorow small Crannies, or Lenells ; So you may

may see great *Axiomes* of *Nature*, through small and Contemptible *Instances*. The *Speedy Depredation* of *Aire* vpon *Watry Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour* from *Glasse* or the *Blade* of a *Sword*, or any such Polished Body; Such as doth not at all Detaine, or Imbibe the Moisture; For the Mistinesse scattereth and breaketh vp suddenly. But the like *Cloud*, if it were *Oyle*, or *Fatty*, will not discharge; Not because it sticketh faster; But because *Aire* preveth vpon *water*; And *Flame*, and *Fire*, vpon *Oyle*; And therefore, to take out a Spot of Grease, they vse a *Coale* vpon browne Paper; because *Fire* worketh vpon Grease, or *Oyle*, as *Aire* doth vpon *water*. And we see *Paper oyled* or *Wood oyled*, or the like, last long moist: but *wet* with *Water*, dry, or putrifie sooner. The Cause is, for that *Aire* medleth little with the *Moisture* of *Oyle*.

T Here is an Admirable demonstration, in the same trifling *Instance* of the *Little Cloud* vpon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force* of *Vnion*, even in the least Quantities, and weakest Bodies, how much it conduceth to Preservation of the present Forme; And the Resisting of a New. For marke well the Discharge of that *Cloud*; And you shall see it ever breake vp, first in the Skirts, and last in the middest. Wee see likewise, that much *water* draweth forth the Iuyce of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation vpon *Bodies*, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small; And so deceiueth many; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Actiue Body, that should subdue it.

Experiment
Solitary touching the Force
of *Vnion*.

92

W E haue spoken before in the fifth *Instance*, of the Cause of *Orient Colours*, in *Birds*; which is by the Fineness of the Strainer: we will now endeouour to reduce the same *Axiome* to a *Worke*. For this Writing of our *Silua Siluarum*, is (to speake properly) not *Naturall History*, but a high kinde of *Naturall Magicke*. For it is not a Description onely of Nature, but a Breaking of Nature, into great and strange Workes. Try therefore, the Anointing ouer of *Pigeons*, or other *Birds*, when they are but in their downe; Or of *Whelpes*, cutting their Haire as short as may bee; Or of some other Beast; with some oyntment, thar is not hurtfull to the Flesh; And that will harden, and sticke very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is receiued, that the *Pulling* off, the first *Feathers* of *Birds*, cleane, will make the new come forth *white*: And it is certaine, that *white* is a penurious Colour, and where Moisture is scant. So *Blew Violets*, and other *Flowers*, if they bee starued, turne Pale and *White*; *Birds*, and *Horses*, by Age, or Scarses, turne *White*; And the *Hoare Haires* of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that come

Experiment
Solitary touching the Producing of *Feathers* and *Haires* of diuers Colours.

93

come first, will bee many times of diuers Colours, according to the Nature of the *Bird*; For that the Skin is more porous; But when the Skin is more shut, and close, the Feathers will come *White*. This is a good *Experiment*, not only for the producing of *Birds*, and *Beasts* of strange Colours; but also for the Disclosure of the Nature of *Colours* themselves; which of them require a finer Porosity, and which a grosser.

Experiment
Solitary tou-
ching the Nou-
rishment of Li-
ving Creatures
before they be
brought forth.

94

IT is a worke of Prouidence, that hath beene truly obserued by some; That the *Tolke* of the *Egge*, conduceth little to the *Generation* of the *Bird*; But onely to the *Nourishment* of the same: For if a *Chicken* bee opened, when it is new hatched; you shall finde much of the *Tolke* remaining. And it is needfull, that *Birds*, that are shaped without the Females Wombe; haue in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and seuered from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; but onely a quickning *Heat* when she sitteth. But *Beasts*, and *Men* need not the matter of Nourishment within themselves, because they are shaped within the Wombe of the Female; and are nourished continually from her Body.

Experiments
in Confort
touching Sym-
pathy and Anti-
pathy for Medi-
cinall use.

95

IT is an Inueterate and receiued Opinion, that *Cantharides* applied to any part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Receiued, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to moue *Grauell*, and to dissolue the *Stone*; In so much, as laid but to the wrest, it hath so forcibly sent downe *Grauell*, as *Men* haue beene glad to remoue it; It was so violent.

96

It is receiued and confirmed by daily Experience, that the *Soales* of the *Feet* haue great Affinity with the *Head*, and the *Mouth* of the *Stomacke*: As we see, *Going wet-shod*. to those that vse it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after try the *Rheume*: And therefore a *Physitian*, that would bee Mysticall, prescribeth, for the Cure of the *Rheume*, that a *Man* should walke Continually vpon a *Camomill Alley*; Meaning that hee should put *Camomill* within his Socks. Likewise *Pigeons Bleeding*, applied to the *Soales* of the *Feet*, ease the *Head*. And *Soporiferous Medicines* applied vnto them, prouoke *Sleepe*.

97

It seemeth, that as the *Feet* haue a Sympathy with the *Head*; So the *wrests* and *Hands*, haue a Sympathy with the *Heart*; We see the Affects and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*; And it is often tried, that Iuyces of *Stock Gilli-flowers*, *Rose Campian*, *Garlicke*, and other things; applied to the *wrests*, and renewed; haue cured long *Agues*. And I conceiue, that washing with certaine *Liquors*, the *Palms* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the *Hands* *Egges* of *Alabaster*, and *Bals* of *Crystall*.

Of these things we shall speake more, when we handle the Title of Sympathy and Antipathy, in the proper Place.

The

Experiment
Solitary touch-
ing the
Secret Processes
of Nature.

98

The Knowledge of Man (hitherto) hath beene determined by the View, or Sight; So that whatsoever is Inuisible, either in respect of the *Finenesse of the Body* it selfe; Or the *Smalnesse of the Parts*; Or of the *Subtily of the Motion*; is little inquired. And yet these bee the Things that Gouverne Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumatics*, that are in all *Tangible Bodies*, are scarce knowne. Sometimes they take them for *Vacuum*; whereas they are the most Active of Bodies. Sometimes they take them for *Aire*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will haue them to bee *Naturall Heat*, or a *Portion of the Element of Fire*; Whereas some of them are Crude and Cold. And sometimes they will haue them to bee the *Vertues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are Things by themselves. And then, when they come to Plants and liuing Creatures, they call them *Soules*. And such Superficiall Speculations they haue; Like Prospectiues, that shew things inward, when they are but Paintings. Neither is this a Question of Words, but infinitely materiall in Nature. For *Spirits* are nothing else but a *Naturall Body*, rarified to a Proportion, and included in the *Tangible Parts* of *Bodies*, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoever, more or lesse; And they are neuer (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Vinification*, and most of the Effects of Nature: For, as wee haue figured them in our *Sapientia Veterum*, in the Fable of *Proserpina*, you shall in the Infernall Regiment heare little Doings of *Plato*, but most of *Proserpina*: For *Tangible Parts* in *Bodies* are Stupide things; And the *Spirits*, doe (in effect) all. As for the differences of *Tangible Parts* in *Bodies*, the industry of the *Chymists* hath given some light, in discerning by their Separations, the *Oily*, *Crude*, *Pure*, *Impure*, *Fine*, *Grosse Parts* of *Bodies*, and the like. And the *Physicians* are content to acknowledge, that *Herbs*, and *Drugs* haue diuers Parts; As that *Opium* hath a Stupefactiue Part, and a Heating Part; The one making Sleepe, the other a Sweat following; And that *Rubarb* hath Purging Parts, and Astringent Parts, &c. But this whole *Inquisition* is weakly and Negligently handled. And for the more subtill differences of the *Minute Parts*, and the Posture of them in the Body, (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts* of *Bodies*, which doe so great Effects, they haue not beene obserued at all, because they are Inuisible, and incurte not to the Eye; but yet they are to bee deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were seene in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientie esse convincitur: Atomum enim nemo vequam vidit.* And therefore the Tumult in the Parts of Solid Bodies, when they are compressed, which is the Cause of all

D

Flight

Flight of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly touched before, and shall bee thoroughly handled in due place) is not scene at all. But neuerthelesse, if you know it not, or enquire it not attentively and diligently, you shall neuer bee able to discern, and much lesse to produce a Number of *Mechanicall Motions*. Againe, as to the *Motions Corporall*, within the Enclosures of Bodies, whereby the Effects (which were mentioned before) passe betweene the *Spirits*, and the *Tangible Parts*; (which are, *Arefaction*, *Colligation*, *Concoction*, *Maturation*, &c.) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Passions*, and such other *Logicall Words*.

Experiment
Solitary touching the
Power of Heat.

96

IT is certaine, that of all *Powers* in *Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewise, that the Effects of *Heat*, are most advanced, when it worketh vpon a Body, without losse or dissipation of the Matter; for that ever betrayeth the Account. And therefore it is true, that the power of *Heat* is best perceived in *Distillations*, which are performed in close Vessells, and Receptacles. But yet there is a higher Degree; For howsoever *Distillations* doe keepe the Body in Cels, and Cloisters, without Going abroad; yet they giue space vnto Bodies to turne into Vapour; To returne into Liquor; and to Seperate one part from another. So as Nature doth Expatiate, although it hath not full Liberty whereby the true and Vltimate Operations of *Heat* are not attained. But if Bodies may bee altered by *Heat*, and yet no such Reciprocation of *Rarefaction*, and of *Condensation*, and of *Separation*, admitted; then it is like that this *Proteus* of *Matter*, being held by the Sleeues, will turne and change into many *Metamorphoses*. Take therefore a *Square Vessell* of *Iron*, in forme of a Cube, and let it haue good thicke and strong Sides. Put into it a Cube of *Wood*, that may fill it as close as may be; And let it haue a Couer of *Iron*, as strong (at least) as the Sides; And let it bee well Luted, after the manner of the *Chymists*. Then place the *Vessell* within burning *Coales*, kept quicke kindled, for some few houres space. Then take the *Vessell* from the *Fire*, and take off the Couer, and see what is become of the *Wood*. I conceiue that since all *Inflammation*, and *Evaporation* are vtterly prohibited, and the *Body* still turned vpon it selfe, that one of these two effects will follow: Either that the *Body* of the *Wood* will bee turned into a kinde of *Amalgama*, (as the *Chymists* call it;) Or that the Finer Part will bee turned into *Aire*, and the Grosser sticke as it were baked, and incrustate vpon the Sides of the *Vessell*; being become of a Denfer Matter, than the *Wood* it selfe, Crude. And for another Triall, take also *water*, and put it in the like *Vessell*, stopped as before, But vse a gentler *Heat*, and remoue the *Vessell* sometimes from the *Fire*; And againe, after some small time when it is Cold, renue the *Heating* of it: And repeat this *Alteration* some few times: And if you can once bring to passe, that the *water*, which is one of the Simplest of Bodies, bee changed in Colour, Odour, or Taste after

after the manner of Compound Bodies, you may bee sure that there is a great Worke wrought in Nature, and a notable Entrance made into strange Changes of Bodies, and productions: And also a Way made to doe that by Fire, in small time, which the Sun and Age doe in long time. But of the Admirable Effects of this *Distillation in Close*, (for so wee will call it) which is like the *Wombs* and *Matrices* of living creatures, where nothing Expirerh, nor Separateth, We will speake fully, in the due place; Not that we Aime at the making of *Paracelsus Pigmeys*; Or any such Prodigious Follies; But that we know the Effects of *Heat* will be such, as will scarce fall vnder the Conceit of Man; If the force of it bee altogether kept in.

T Here is nothing more Certaine in Nature, than that it is impossible for any *Body*, to be vtterly *Annihilated*; But that, as it was the worke of the Omnipotency of God, to make *Somewhat* of *Nothing*; So it requirerh the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well said, by an Obscure Writer of the *Seet* of the *Chymists*; That there is no such way to effect the Strange *Transmutations* of *Bodies*, as to endeavour and vrge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained also a great Secret of Preservation of Bodies from Change; For if you can prohibite, that they neither turne into *Aire*, because no *Aire* commeth to them; Nor goe into the *Bodies Adiacent*, because they are vtterly Heterogeneall; Nor make a *Round* and *Circulation* within themselves; they will neuer Change, though they bee in their Nature neuer so Perishable, or Mutable. Wee see, how *Flies*, and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument*, and *Embalming* of the *Body* of any *King*. And I conceiue the like will be of *Bodies* put into *Quick-silver*. But then they must be but thin;

As a leafe, or a Peece of Paper, or Parchment; For if they haue a greater Crassitude, they will alter in their owne Bo-

dy, though they spend not. But of this

we shall speake more, when

we handle the *Title* of

Conservation of
Bodies.

Experiment
Solitary, rou-
ching the Im-
possibility of An-
nihilation.

100

D 2

NATV



NATVRALL HISTORIE.

II. Century.



MUSICKE in the *Practice*, hath beene well pursued ; And in good Variety ; But in the *Theory*, and especially in the *Reelding* of the *Causes* of the *Practique*, very weakly ; Being reduced into certaine *Mysticall Subtilties*, of no vse, and not much Truth. Wee shall therefore after our manner, ioyne the *Contemplatiue* and *Active Part* together.

All *Sounds*, are either *Musicall Sounds*, which we call *Tones* ; Whereunto there may be an *Harmony* ; which *Sounds* are ether *Equall* ; As *Singing*, the *Sounds* of *Stringed*, and *Wind-Instruments*, the *Ringings* of *Bells*, &c. Or *Immusicall Sounds* ; which are euer *Vnequall* ; Such as are the *Voice* in *Speaking*, all *whisperings*, all *Voices* of *Beasts* and *Birds*, (except they bee *Singing Birds* ;) all *Percussions*, of *Stones*, *wood*, *Parchment*, *Skins*, (as in *Drums* ;) and infinite others.

The *Sounds* that produce *Tones*, are euer from such *Bodies*, as are in their *Parts* and *Porcs* *Equall* ; As well as the *Sounds* themselves are *Equall* ; And such as are the *Percussion* of *Mettall*, as in *Bells*, Of *Glasse*, as in the *Filipping* of a *Drinking Glasse*, Of *Aire*, as in *Mens voices* whilest they *Sing*, in *Pipes*, *Whistles*, *Organs*, *Stringed instruments*, &c. And of *Water* : as in the *Nightingale-pipes* of *Regalls*, or *Organs*, and other *Hydraulickes* ;

Experiments
in *Confort*
touching *Mu-*
sicks.

101

102

which the *Ancients* had, and *Nero* did so much esteeme, but are now lost. And if any Man thinke, that the *String* of the *Bow*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an error. For the *Sound* is not created betweene the *Bow* or *Plectrum*, and the *String*; but betweene the *String* and the *Aire*; No more than it is betweene the *Finger* or *Quill*, and the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that create *Tones*; *Percussions* of *Metalls* (comprehending *Glasse*, and the like;) *Percussions* of *Aire*; and *Percussions* of *Water*.

103

The *Diapason* or *Eight* in *Musicke* is the sweetest *Concord*; Inasmuch, as it is in effect an *Unison*; As we see in *Lutes*, that are strung in the *Base Strings* with two strings, one an *Eight* above another; Which make but as one *Sound*. And every *Eighth Note* in Ascent (as from *Eight* to *Fifteene*, from *Fifteene* to *twenty two*, and so in infinitum,) are but *Scales of Diapason*. The *Cause* is darke, and hath not beene rendred by any; And therefore would be better contemplated. It seemeth that *Aire*, (which is the Subject of *Sounds*) in *Sounds* that are not *Tones* (which are all *unequall*, as hath beene said) admitteth much *Variety*; As we see in the *Voices* of *Living Creatures*; And likewise in the *Voices* of severall *Men*; (for we are capable to discern severall *Men* by their *Voices*;) and in the *Coniugation of Letters*; whence *Articulate Sounds* proceed; Which of all others are most various. But in the *Sounds* which we call *Tones*, (that are ever *Equall*) the *Aire* is not able to cast it selfe into any such variety; But is forced to recurre into one and the same *Posture* or *Figure*, onely differing in *Greatnesse* and *Smalnesse*. So we see *Figures* may be made of lines, *Crooked* and *Streight* in infinite *Variety*, where there is *Inequality*; But *Circles*, or *Squares*, or *Triangles Equilaterall* (which are all *Figures*, of *equall lines*) can differ but in *Greater*, or *Lesser*.

104

It is to be noted (the rather lest any Man should thinke, that there is any thing in this number of *Eight*, to create the *Diapason*) that this *Computation of Eight*, is a thing rather received, than any true *Computation*. For a true *Computation* ought ever to be, by *Distribution* into *equall Portions*. Now there be interuenient in the *Rise of Eight* (in *Tones*) two *Beemolls*, or *Halfe notes*; So as if you diuide the *Tones* equally, the *Eight* is but seven whole and *equall Notes*; And if you subdiuide that into *Halfe Notes* (as it is in the *Stops of a Lute*) it maketh the *Number of Thirteene*.

105

Yet this is true; That in the ordinary *Rises* and *Falls* of the *Voice* of *Man* (not measuring the *Tone* by whole *Notes*, and halfe *Notes*, which is the *Equall Measure*;) there fall out to be two *Beemolls* (as hath beene said) betweene the *Unison* and the *Diapason*: And this *Varying* is naturall. For if a Man would endeuour to raise or fall his *Voice*, still by *Halfe-notes*, like the *Stops of a Lute*; or by whole *Notes* alone, without *Halves*, as farre as an *Eight*; he will not be able to frame his *Voice* vnto it. Which sheweth that after every three whole *Notes* Nature requireth, for all *Harmonicall* vse, one *Halfe-Note* to be interposed.

106

It is to be considered, that whatsoeuer *Vertue* is in *Numbers*, for
Conducing

ret rit



Conducing to Consent of *Notes*, is rather to bee ascribed to the *Ante-Number*, than to the *Entire Number*; As namely, that the Sound returneth after *Six*, or after *Twelve*; So that the *Seuen*, or the *Thirteenth*, is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seuen* and the *Thirteenth* are but the limits and Boundaries of the *returne*.

107

The *Concords* in *Musicke* which are *Perfect*, or *Semiperfect*, betweene the *Unison*, and the *Diapason*, are the *Fifth*, which is the most *Perfect*, the *Third* next; and the *Sixth* which is more harsh: And as the *Ancients* esteemed, and so doe my selfe and some Other yet, the *Fourth* which they call *Diatessaron*. As for the *Tenth*, *Twelfth*, *Thirteenth*, and so in *infinitum*; they be but *Reurrences* of the Former; viz. of the *Third*, the *Fifth*, and the *Sixth*, being an *Eight* respectiue from them.

108

For *Discords*, the *Second*, and the *Seuen*, are of all others the most odious, in *Harmony*, to the *Sense*; whereof the One is next about the *Unison*, the Other next vnder the *Diapason*: which may shew, that *Harmony* requireth a competent distance of *Notes*.

109

In *Harmony*, if there bee not a *Discord* to the *Base*, it doth not disturb the *Harmony*, though there bee a *Discord* to the *Higher Parts*; So the *Discord* bee not of the Two that are Odious; And therefore the ordinary *Consent* of *Four* Parts consisteth of an *Eight*, a *Fifth*, and a *Third* to the *Base*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the Cause is, for that the *Base* striking more Aire, doth ouercome and drowne the *Treble*, (vnlesse the *Discord* bee very Odious;) And so hideth a small Imperfection. For we see, that in one of the *Lower strings* of a *Lute*, there foundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but onely the Sound of the *Base*.

110

Wee haue no *Musicke* of *Quarter-Notes*; And it may bee, they are not capable of *Harmony*; For wee see the *Halfe-Notes* themselves doe but interpose sometimes. Neuerthelesse we haue some *Slides*, or *Relishes*, of the Voice, or Strings, as it were continued without *Notes*, from one *Tone* to another, rising or falling, which are delightfull.

111

The Causes of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receiue light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There bee two Things *Pleasing* to the *Sight*, (leauing *Pictures*, and *Shapes* aside; which are but *Secondary Obiects*; And please or displease but in *Memory*;) these two are, *Colours*, and *Order*. The *Pleasing* of *Colour* symbolizeth with the *Pleasing* of any *Single Tone* to the *Eare*; But the *Pleasing* of *Order* doth symbolize with *Harmony*. And therefore wee see in *Garden-knots*, and the *Frets of Houses*, and all equall and well answering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylinders*, &c.) how they please; whereas *unequall Figures* are but *Deformities*. And both these *Pleasures*; that of the *Eye*, and that of the *Eare*, are but the Effects of *Equality*: *Good Proportion*, or *Correspondence*: So that (out of *Question*;) *Equality*, and *Correspondence*, are the Causes of *Harmony*. But to finde the *Proportion* of that *Correspondence*, is more abstruse; whereof notwithstanding wee shall speake somewhat, (when we handle *Tones*;) in the generall Enquiry of *Sound*:

Tones

112

Tunes are not so apt altogether to procure *Sleepe*, as some other *Sounds*; As the *Winde*, the *Purling of water*, *Humming of Bees*, a *Sweet Voice* of one that readeth, &c. The *Cause* whereof is, for that *Tunes*, because they are Equall; and slide not, doe more strike and erect the *Sense*, than the other. And Over-much *Attention* hindereth *Sleepe*.

113

There bee in *Musicke* certaine *Figures*, or *Tropes*, almost agreeing with the *Figures of Rhetorike*; And with the *Affections* of the *Minde*, and other *Senses*. First, the *Division* and *Quawering*, which please so much in *Musicke*, haue an Agreement with the *Glittering of Light*; As the *Moone-Beames* playing vpon a *Waue*. Againe, the *Falling* from a *Discord* to a *Concord*, which maketh great *Sweetnesse* in *Musicke*, hath an Agreement with *Affections*, which are reinitigated to the better, after some dislikes: It agreeth also with the *Taste*, which is soone gluttred with that which is sweet alone. The *Sliding from the Close* or *Cadence*, hath an Agreement with the *Figure* in *Rhetorike*, which they call *Preter Expectatum*; For there is a Pleasure euen in *Being deceiued*. The *Reports* and *Fuges*, haue an Agreement with the *Figures* in *Rhetorike*, of *Repetition*, and *Traduction*. The *Tripla's*, and *Changing of Times*, haue an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Measure Time*, are in the *Medley*, of one *Dance*.

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It hath beene anciently held; and obserued, that the *Sense of Hearing*, and the *Kindes of Musicke*, haue most Operation vpon *Manners*; As to Incourage Men, and make them *Warlike*; To make them *Soft* and *Ef-feminate*; To make them *Graue*; To make them *Light*; To make them *Gentle* and inclined to *Pity*, &c. The *Cause* is, for that the *Sense of Hearing* striketh the *Spirits* more immediately, than the other *Senses*; And more incorporeally than the *Smelling*: For the *Sight*, *Taste*, and *Feeling*, haue their *Organs*, not of so present and immediate Accessse to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh also immediately vpon the *Spirits*, and is forcible while the *Obiect* remaineth,) it is with a *Communication* of the *Breath*, or *Vapour* of the *Obiect* *Odorate*: But *Harmony* entring easily, and Mingling not at all, and Comming with a *Manifest Motion*; doth by *Custom* of often Affecting the *Spirits*, and Putting them into one kinde of *Posture*, alter not a little the *Nature* of the *Spirits*, euen when the *Obiect* is removed. And therefore wee see, that *Tunes* and *Aires*, euen in their owne *Nature*, haue in themselves some *Affinity* with the *Affections*; As there bee *Merry Tunes*, *Dolefull Tunes*, *Solemne Tunes*; *Tunes inclining Mens Mindes to Pity*; *Warlike Tunes*; &c. So as it is no Maruell, if they alter the *Spirits*; Considering that *Tunes* haue a *Predisposition* to the *Motion* of the *Spirits* in themselves. But yet it hath beene noted, that though this variety of *Tunes*, doth dispose the *Spirits* to variety of *Passions*, conforme vnto them; yet generally, *Musicke* feedeth that disposition of the *Spirits* which it findeth. Wee see also that seuerall *Aires*, and *Tunes*, doe please seuerall *Nations*, and *Persons*, according to the *Sympathy* they haue with their *Spirits*.

Perspective.

Experiments
in Consort,
touching
Sounds; and first
touching the
Nulity and En-
tity of Sounds.

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Perspectiue hath beene with some diligence inquired; And so hath the *Nature of Sounds*, in some sort, as farre as concerneth *Musicke*. But the *Nature of Sounds* in generall, hath beene superficially obserued. It is one of the subtillest Peecces of Nature. And besides, I practise, as I doe aduise: which is, after long Inquiry of Things, Immerse in Matter, to interpose some Subiect, which is Immaterial, or lesse Material; Such as this of *Sounds*. To the end, that the *Intellect* may be Rectified, and become not Partiall.

It is first to be considered, what *Great Motions* there are in Nature, which passe without *Sound*, or *Noise*. The *Heauens* turne about, in a most rapide Motion, without *Noise* to vs perceiued; Though in some *Dreames* they haue beene said to make an excellent *Musicke*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, &c.) yeeld no *Noise*. And if it be thought, that it is the Greatnesse of distance from vs, whereby the *Sound* cannot be heard, Wee see that *Lightnings*, and *Coruscations*, which are neere at hand, yeeld no *Sound* neither. And yet in all these, there is a Percussion and Diuision of the *Aire*. The *Winds* in the *Vpper Region* (which moue the *Clouds* about (which wee call the *Racke*) and are not perceiued below) passe without *Noise*. The *Lower Winds* in a plaine, except they be strong, make no *Noise*; But amongst *Trees*, the *Noise* of such *Winds* will be perceiued. And the *Winds* (generally) when they make a *Noise*, doe euer make it vnequally, Rising and Falling, and sometimes (when they are vehement) Trembling at the Height of their Blast. *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noise*, in passing thorow the *Aire*, till it fall vpon the Ground, Water, Houses, or the like. *Water* in a *Riuer* (though a swift Streame) is not heard in the Channell, but runneth in Silence, if it be of any depth; But the very *Streame* vpon *Shallowes*, or *Gratiell*, or *Pebble*, will be heard. And *waters*, when they beat vpon the Shore, or are straitned, (as in the falls of *Bridges*;) Or are dashed against themselves by *winds*, giue a Roaring *Noise*. Any peece of *Timber*, or *Hard Bodie*, being thrust forwards by another Body Contiguous, without knocking, giueth no *Noise*. And so *Bodies* in weighing, one vpon another, though the *upper Body* presse the *Lower Body* downe, make no *Noise*. So the *Motion* in the *Minute Parts* of any *Solide Body*, (which is the Principall Cause of *Violent Motion*, though vnobserved;) passeth without *Sound*; For that *Sound*, that is heard sometimes, is produced onely by the Breaking of the *Aire*; And not by the Impulsion of the Parts. So it is manifest; That where the Anterious Body giueth way, as fast as the Posterior commeth on, it maketh no *Noise*; be the *Motion* neuer so great or swift.

Aire open, and at Large, maketh no *Noise*, except it be sharply percussed; As in the *Sound* of a String, where *Aire* is percussed by a hard, and

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and stiffe Body ; And with a sharpe loose ; For if the String bee not strained, it maketh no *Noise*. But where the *Aire* is pent, and straitned, there Breath or other Blowing, (which carry but a gentle Percussion) suffice to create *Sound* ; As in *Pipes*, and *wind-Instruments*. But then you must note, that in *Recorders*, which goe with a gentle Breath, the *Concane* of the *Pipe*, were it not for the *Fipple*, that straitneth the *Aire* (much more than the *Simple Concane* ;) would yeeld no *Sound*. For as for other *wind-Instruments*, they require a forcible Breath ; As *Trumpets*, *Corsets*, *Hunters Hornes*, &c. Which appeareth by the blowne cheekes of him that windeth them. *Organs* also are blowne with a strong winde, by the Bellowes. And note againe, that some kinde of *wind-Instruments*, are blowne at a small Hole in the side, which straitneth the Breath at the first Entrance ; The rather in respect of their *Trauerse*, and *Stop* aboute the Hole, which performeth the *Fipples* Part ; As it is seene in *Flutes*, and *Fifes*, which will not giue *Sound*, by a Blast at the end, as *Recorders*, &c. doe. Likewise in all *whistling*, you contract the Mouth ; And to make it more sharpe, Men sometimes vse their Finger. But in *Open Aire*, if you throw a Stone, or a Dart, they giue no *Sound* : No more doe *Bullets*, except they happen to bee a little hollowed in the Casting ; Which Hollownesse penneth the *Aire* : Nor yet *Arrowes*, except they be ruffled in their Feathers, which likewise penneth the *Aire*. As for *Small whistles*, or *Shepherds Oaten Pipes* ; they giue a *Sound*, because of their extreme Slendernesse, whereby the *Aire* is more pent, than in a Wider *Pipe*. Againe, the *Voices* of *Men*, and *Liuing Creatures*, passe thorow the throat, which penneth the Breath. As for the *Iewes Harpe*, it is a sharpe Percussion ; And besides, hath the vantage of penning the *Aire* in the Mouth.

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Solide Bodies, if they be very softly percussed, giue no *Sound* ; As when a man treadeth very softly vpon *Boards*. So *Chests* or *Doores* in faire weather, when they open easily, giue no *Sound*. And *Car-wheeles* squeake not when they are liquored.

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The *Flame* of *Tapers*, or *Candles*, though it be a swift Motion, and breaketh the *Aire*, yet passeth without *Sound*. *Aire* in *Ouens*, though (no doubt) it doth (as it were) boyle, and dilate it selfe, and is repercussed ; yet it is without *Noise*.

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Flame percussed by Aire, giueth a *Noise* ; As in Blowing of the Fire by Bellowes ; Greater, than if the Bellowes should blow vpon the *Aire* it selfe. And so likewise *Flame percussing the Aire strongly*, (as when Flame suddenly taketh, and openeth,) giueth a *Noise* ; So, Great *Flames*, whiles the one impelleth the other, giue a bellowing *Sound*.

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There is a Conceit runneth abroad, that there should bee a *white Powder*, which will discharge a Peece without *Noise* ; which is a dangerous Experiment, if it should bee true : For it may cause secret Murthers. But it seemeth to mee vnpossible ; For, if the *Aire* pent, bee driven forth and strike the *Aire* open, it will certainly make a *Noise*. As for the *White Powder*, (if any such thing bee, that may extinguish, or dead the *Noise*,) it

it is like to be a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any man thinke, that the *Sound* may bee extinguished, or deaded, by discharging the *Pent Aire*, before it cometh to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more diuided *Sounds*: As if you should make a *Crosse Barrell* hollow, thorow the Barrell of a *Peece*, it may be, it would giue seuerall *Sounds*, both at the *Nose*, and at the *sides*. But I conceiue, that if it were possible, to bring to passe, that there should bee no *Aire* pent at the *Mouth* of the *Peece*, the *Bullet* might flye with small, or no *Noise*. For first it is certaine, there is no *Noise* in the *Percussion* of the *Flame* vpon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*; As hath beene said. And then, if there be no *Pent Aire* that striketh vpon *Open Aire*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath beene oft said) is in the Parts of the *Bullet*, and not in the *Aire*. So as triall must be made by taking some small *Concaue* of *Metall*, no more than you meane to fill with powder; And laying the *Bullet* in the *Mouth* of it, halfe out into the *Open Aire*.

I heard it affirmed by a Man, that was a great Dealer in Secrets, but he was but vaine; That there was a *Conspiracy* (which himselfe hindred,) to haue killed *Queene Mary*, Sister to *Queene Elizabeth*, by a *Burning glasse*, when she walked in *Saint Iames Parke*, from the Leads of the House. But thus much (no doubt) is true; That if *Burning-Glasses* could be brought to a great strength, (as they talke generally of *Burning-Glasses*, that are able to burne a *Navy*.) the *Percussion* of the *Aire* alone, by such a *Burning glasse*, would make no *Noise*; No more than is found in *Coruscations*, and *Lightnings*, without *Thunders*.

I suppose, that *Impression* of the *Aire* with *Sounds*, asketh a time to be conueighed to the *Sense*; As well as the *Impression* of *Species visible*: Or else they will not be heard. And therefore as the *Bullet* moueth so *swife*, that it is *Inuisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*: For wee see, that the *Apprehension* of the *Eye*, is quicker than that of the *Eare*.

All *Eruptions* of *Aire*, though small and slight; giue an *Entity* of *Sound*; which wee call *Crackling*, *puffing*, *Spitting*, &c. As in *Bay-salt*, and *Bay-leaues*, cast into the Fire; So in *Chestnuts*, when they leape forth of the Ashes; So in *Greene wood*, laid vpon the Fire, especially *Roots*, So in *Candles* that spit Flame, if they bee wet; So in *Rasping*, *Sneezing*, &c. So in a *Rose Lease* gathered together into the fashion of a Purse, and broken vpon the Fore-head, or Backe of the Hand, as Children vse.

THE Cause giuen of *Sound*, that it should be an *Elision* of the *Aire* (wherby, if they meane any thing, they meane a *Cutting*, or *Diuiding* or else an *Attenuating* of the *Aire*) is but a Terme of Ignorance; And the Motion is but a Catch of the Wit vpon a few Instances; As the Manner is in the *Phylosophy* Receiued. And it is common with Men, that if they haue

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haue gotten a Pretty *Expression*, by a *Word of Art*, that *Expression* goeth curreant; though it bee empty of *Matter*. This Conceit of *Elision*, appeareth moſt manifeſtly to bee falſe, in that the *Sound* of a *Bell*, *ſtring*, or the like, continueth melting, ſome time, after the *Percuſſion*; But ceaſeth ſtreight-waves, if the *Bell*, or *String*, be touched and ſtayed; whereas, if it were the *Elision* of the *Aire*, that made the *ſound*, it could not bee, that the Touch of the *Bell*, or *String*, ſhould extinguiſh ſo ſuddenly that Motion, cauſed by the *Elision* of the *Aire*. This appeareth yet more manifeſtly, by *Chiming* with a Hammer, vpon the Out-ſide of a *Bell*; For the *Sound* will be according to the inward Concaue of the *Bell*; whereas the *Elision*, or *Attenuation* of the *Aire*, cannot bee but onely betweene the Hammer, and the Out-ſide of the *Bell*. So againe, if it were an *Elision*, a broad Hammer, and a *Bodkin*, ſtrucke vpon Metall, would giue a diuers *Tone*; As well as a diuers *Loudneſſe*: But they doe not ſo; For though the *Sound* of the one bee *Louder*, and of the other *Softer*, yet the *Tone* is the ſame. Beſides, in *Eccho's*, (whereof ſome are as loud as the *Originall Voice*,) there is no new *Elision*; but a *Repercuſſion* onely. But that which convinceth it moſt of all, is, that *Sounds* are generated, where there is no *Aire* at all. But theſe and the like Conceits, when Men haue cleared their vnderſtanding, by the light of Experience, will ſcatter, and breake vp like a Miſt.

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It is certaine, that *ſound* is not produced at the firſt, but with ſome *Locall Motion* of the *Aire*, or *Flame*, or ſome other *Medium*. Nor yet without ſome *Reſiſtance*, either in the *Aire*, or the *Body Percuſſed*. For if there bee a meere Yeelding, or Ceſſion, it produceth no *ſound*; As hath bene ſaid. And therein *Sounds* differ from *Light*, and *Colours*; which paſſe thorow the *Aire*, or other *Bodies*, without any *Locall Motion* of the *Aire*; either at the firſt. or after. But you muſt attentiuely diſtinguiſh, betweene the *Locall Motion* of the *Aire*, (which is but *Vehiculum Cauſſæ*, A *Carrier of the Sounds*.) and the *Sounds* themſelves, Conueighed in the *Aire*. For as to the former, wee ſee manifeſtly, that no *ſound* is produced (no not by *Aire* it ſelfe againſt other *Aire*, as in *Organs*, &c.) but with a perceptible *Blaſt* of the *Aire*; And with ſome *Reſiſtance* of the *Aire*; ſtrucken. For euen all *ſpeech*, (which is one of the gentleſt *Motions* of *Aire*;) is with expulſion of a little *Breath*. And all *Pipes* haue a *Blaſt*, as well as a *ſound*. Wee ſee alſo manifeſtly, that *Sounds* are carried with *Winde*: And therefore *Sounds* will bee heard further with the *winde*, than againſt the *winde*; And likewise doe riſe and fall with the Intenſion or Remiſſion of the *Winde*. But for the *Impreſſion* of the *ſound*, it is quite another Thing; And is utterly without any *Locall Motion* of the *Aire*, Perceptible; And in that reſembleth the *Species viſible*: For after a *Man* hath lured, or a *Bell* is rung, wee cannot diſcerne any *Perceptible Motion* (at all) in the *Aire*, as long as the *ſound* goeth; but onely at the firſt. Neither doth the *Wind* (as farre as it carrieth a *Voice*;) with the *Motion* thereof, confound any of the Delicate, and Articulate Figurations of the *Aire*, in Variety of Words. And if a *Man* ſpeake a good loudneſſe, againſt the

the *Flame* of a *Candle*, it will not make it tremble much ; though most, when those *Letters* are pronounced, which contract the Mouth ; As *F*, *S*, *V*, and some others. But *Gentle Breathing*, or *Blowing* without *speaking*, will moue the *Candle* farre more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, because as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at first ; So it paralleleth in so many other things with the *Sight*, and *Radiation of things visible*, Which (without all question) induce no *Locall Motion* in the *Aire*, as hath beene said.

Neuerthelesse it is true, that vpon the *Noise* of *Thunder*, and great *Ordinance* ; Glasse windowes will shake ; and Fishes are thought to bee fraied with the Motion, caused by *Noise* vpon the *Water*. But these Effects are from the *Locall Motion* of the *Aire*, which is a Concomitant of the *Sound* (as hath beene said ;) and not from the *Sound*.

It hath beene anciently reported, and is still receiued, that *Extreme Applauses*, and *Shouting of People* assembled in great Multitudes, haue so rarified, and broken the *Aire*, that *Birds* flying ouer, haue falne downe, the *Aire* being not able to support them. And it is beleeued by some, that *Great Ringing of Bells* in populous Cities, hath chased away *Thunder* : and also dissipated Pestilent *Aire* : All which may be also from the Concussion of the *Aire*, and not from the *Sound*.

A very great *Sound*, neere hand, hath stricken many *Deafe* ; And at the Instant they haue found, as it were, the breaking of a Skin or Parchment in their *Eare* : And my selfe standing neere on that *Loud* loud, and shrill, had suddenly an Offence, as it somewhat had broken, or beene dislocated in my *Eare* ; And immediately after, a *loud Ringing* ; (Not an ordinary Singing, or Hissing, but farre louder, and differing ;) so as I feared some *Deafenesse*. But after some halfe Quarter of an Houre it vanished. This Effect may be truly referred vnto the *Sound* : For (as is commonly receiued) an *ouer-potent Object* doth destroy the *Sense* ; And *spirituall Species*, (both *Visible* and *Audible*) will worke vpon the Sensories, though they moue not any other *Body*.

In *Delation of Sounds*, the *Enclosure* of them preserueth them, and causeth them to bee heard further. And wee finde in *Rolls* of Parchment, or *Trunkes*, the Mouth being laid to the one end of the *Roule* of Parchment, or *Trunke* ; and the *Eare* to the other, the *Sound* is heard much further, than in the *Open Aire*. The *Cause* is, for that the *Sound* spendeth, and is dissipated in the *Open Aire* ; But in such *Concaues* it is conserued, and contracted. So also in a *Peece* of *Ordinance*, if you speake in the *Touch-hole*, and another lay his *Eare* to the Mouth of the *Peece*, the *Sound* passeth, and is farre better heard, than in the *Open Aire*.

It is further to bee considered, how it proueth, and worketh, when the *Sound* is not enclosed all the Length of his *Way*, but passeth partly thorow open *Aire* ; As where you *speaks* some distance from a *Trunke* ; or where the *Eare* is some distance from the *Trunke*, at the other End ; Or where both *Mouth* and *Eare* are distant from the *Trunke*. And

it is tried, that in a long *Trunke*, of some eight or ten foot, the *Sound* is holpen, though both the *Mouth*, and the *Eare* bee a handfull, or more, from the Ends of the *Trunke* ; And somewhat more holpen, when the *Eare* of the *Hearer* is neere, than when the *Mouth* of the *Speaker*. And it is certaine, that the *Voice* is better heard in a *Chamber* from *abroad*, than *abroad* from within the *Chamber*.

131 As the *Enclosure*, that is *Round about and Entire*, preserveth the *Sound* ; So doth a *Semi-Concave*, though in a lesse degree. And therefore, if you diuice a *Trunke* or a *Cane* into two, and one speake at the one end, and you lay your *Eare* at the other, it will carry the *Voice* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-Concave* ; but if you doe the like vpon the *Mast* of a *Ship*, or a *long Pole*, or a *Pece of Ordnance* (though one speake vpon the *Surface* of the *Ordnance*, and not at any of the *Bores*;) the *Voice* will be heard further, than in the *Aire* at large.

132 It would bee tried, how, and with what proportion of disadvantage, the *Voice* will bee carried in an *Horne*, which is a line *Arched* ; Or in a *Trumpet*, which is a *Line Retorted* ; Or in some *Pipe* that were *Sinuous*.

133 It is certaine, (howsoeuer it crosse the *Receiued Opinion*) that *Sounds* may be created without *Aire*, though *Aire* bee the most fauourable *Deferent* of *Sounds*. Take a *Vessell* of *Water*, and knap a paire of *Tongs* some depth within the *Water*, and you shall heare the *Sound* of the *Tongs* well, and not much diminished ; And yet there is no *Aire* at all present.

134 Take one *Vessell* of *Siluer*, and another of *Wood*, and fill each of them full of *Water*, and then knap the *Tongs* together, as before, about an handfull from the *Bottom*, and you shall finde the *Sound* much more *Resounding* from the *Vessell* of *Siluer*, than from that of *wood* : And yet if there bee no *Water* in the *Vessell*, so that you knap the *Tongs* in the *Aire*, you shall finde no difference, betweene the *Siluer* and *woodden Vessell*. Whereby, beside the maine point of creating *sound* without *Aire*, you may collect two things : The one, that the *Sound* communicateth with the *Bottom* of the *Vessell* : The other, that such a *Communication* passeth farre better, thorow *water*, than *Aire*.

135 Strike any *Hard Bodies* together, in the *Middest* of a *Flame*, and you shall heare the *Sound*, with little difference, from the *Sound* in the *Aire*.

136 The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath some *Affinity* with the *Aire*, performeth, in some degree, the *Parts* of the *Aire* ; As when you knocke vpon an *Empty Barrell*, the *Sound* is (in part) created by the *Aire* on the *Out-side* ; And (in part) by the *Aire* in the *Inside* ; For the *Sound* will bee greater or lesser, as the *Barrell* is more *Empty*, or more full ; But yet the *Sound* participateth also with the *Spirit* in the *wood*, thorow which it passeth, from the *Out-side* to the *Inside* : And so it commeth to passe, in the *Chiming* of *Bels*, on the *Out-side* ; where also the *Sound* passeth to the *Inside* : And a number of o-

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ther like Instances, whereof we shall speake more, when wee handle the *Communication of Sounds*.

It were extreme Grossenesse to thinke (as wee haue partly touched before) that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehicula Motus*, *Passages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulsion* of the *Aire*, from the first *Motion* of the *String*; but by the *Returne* or *Result* of the *String*, which was strained by the *Touch*, to his former Place: which *Motion* of *Result* is quicke and sharpe; Whereas the first *Motion*, is soft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a *Continuall Trepidation*.

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TAKE a *Trunke*, and let one whistle at the one End, and hold your Eare at the other, and you shall finde the *Sound* strike so sharpe, as you can scarce endure it. The *Cause* is; for that *Sound* diffuseth it selfe in round; And so spendeth it selfe; But if the *Sound*, which would scatter in *Open Aire*, bee made to goe all into a *Canale*; It must needs giue greater force to the *Sound*. And so you may note, that *Enclosures* doe not only preserve *Sound*, but also Encrease and Sharpen it.

A *Hunters Horne*, being greater at one end, than at the other, doth increase the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cause* is, for that the *Aire*, and *Sound*, being first contracted at the lesser end, and afterwards hauing more Roome to spread at the greater end; doe dilate themselues; And in Comming out strike more *Aire*; whereby the *Sound* is the Greater, and Baser. And euen *Hunters Hornes*, which are sometimes made streight, and not Oblique, are euer greater at the lower end. It would be tried also in *Pipes*, being made far larger at the lower end: Or being made with a *Belly* towards the lower End; And then issuing into a streight Concaue againe:

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There is in *Saint James fields*, a *Conduit* of *Bricke*, vnto which ioyneth a *low Vault*; And at the End of that, a *Round House* of *Stone*: And in the *Bricke Conduit* there is a *Window*; And in the *Round House* a *Slit* or *Rift* of some little breadth: If you cry out in the *Rift*, it will make a fearfull Roaring at the *Window*. The *Cause* is the same with the former; For that all *Concaues*, that proceed from more *Narrow* to more *Broad*, doe amplify the *Sound* at the *Comming* out.

Hawkes Bells, that haue *Holes* in the *Sides*, giue a greater Ring, than if the *Pellet* did strike vpon *Brasse*, in the *Open Aire*: The *Cause* is the same with the first *Instance* of the *Trunke*; Namely, for that the *Sound* Enclosed with the *Sides* of the *Bell*, commeth forth at the *Holes* vnspente, and more strong.

In *Drummes*, the Closenesse round about, that preserveth the *Sound* from disperfing, maketh the *Noise* come forth at the *Drum Hole*, farre more loud, and strong, than if you shouldestrike vpon the like *Skin*, extended

tended in the Open Aire. The Cause is the same with the two precedent.

143

Sounds are better heard, and further off, in an Evening, or in the Night, than at the Noone, or in the Day. The Cause is, for that in the Day, when the Aire is more Thin, (no doubt) the Sound pierceth better; But when the Aire is more Thicke (as in the Night) the Sound spendeth and spreadeth abroad lesse: And so it is a Degree of Enclosure. As for the Night, it is true also, that the Generall Silence helpeth.

144

There bee two Kinds of Reflexions of Sounds; The one at Distance, which is the Echo; Wherein the Originall is heard distinctly, and the Reflexion also distinctly; Of which wee shall speake hereafter: The other in Concurrence; When the Sound Reflecting (the Reflexion being neere at hand) returneth immediately vpon the Originall, and so iterateth it not, but amplifieth it. Therefore we see, that Musicke vpon the water soundeth more; And so likewise Musicke is better in Chambers Wainscotted, than Hanged.

145

The Strings of a Lute, or Violl, or Virginalls, doe giue a farre greater Sound, by reason of the Knot, and Board, and Concave vnderneath, than if there were nothing but onely the Flat of a Board, without that Hollow and Knot, to let in the Vpper Aire into the Lower. The Cause is, the Communication of the Vpper Aire with the Lower; And penning of both from Expencc, or dispersing.

146

An Irish Harpe hath Open Aire on both sides of the Strings: And it hath the Concave or Belly, not along the Strings, but at the End of the Strings. It maketh a more Resounding Sound, than a Bandora, Orpharion, or Cisterne, which haue likewise wire-strings. I iudge the Cause to bee, for that Open Aire on both Sides helpeth, so that there be a Concave; Which is therefore best placed at the End.

147

In a Virginall, when the Lid is downe, it maketh a more exile Sound, than when the Lid is open. The Cause is, for that all Shutting in of Aire, where there is no competent Vent, dampeth the Sound. Which maintaineth likewise the former Instance; For the Belly of the Lute, or Violl, doth pen the Aire somewhat.

148

There is a Church at Glocester (and as I haue heard, the like is in some other places;) where if you speake against a Wall, softly, another shall heare your Voice better a good Way off, than neere hand. Enquire more particularly of the Frame of that place. I suppose there is some Vault, or Hollow, or Isle, behind the Wall, and some Passage to it towards the further end of that Wall, against which you speake; So as the Voice of him that speaketh, slideth along the Wall, and then entreth at some Passage, and communicateth with the Aire of the Hollow; for it is preserued somewhat by the plaine Wall; but that is too weake to giue a Sound Audible, till it hath communicated with the backe Aire.

149

Strike vpon a Bow-string, and lay the Horne of the Bow neere your Eare, and it will encrease the Sound, and make a degree of a Tone. The Cause is, for that the Sensory, by reason of the Close Holding, is percussed,

cuffed, before the Aire disperseth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great *Enter-course* betweene those two Parts; As appeareth by this; That a Harsh *Grating Tune* setteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put vpon the Temples; But that is but the *Slide* of the *Sound* from thence to the Eare.

If you take a *Rod* of *Iron*, or *Brasse*, and hold the one end to your Eare, and strike vpon the other, it maketh a far greater *Sound*, than the like *Stroke* vpon the *Rod*, not so made *Contiguous* to the Eare. By which, and by some other *Instances*, that haue beene partly touched, it should appeare; That *Sounds* doe not onely slide vpon the Surface of a *Smooth Body*, but doe also communicate with the *Spirits*, that are in the *Pores* of the *Body*.

I remember in *Trinity College* in *Cambridge*, there was an *Vpper Chamber*, which being thought weake in the *Roote* of it, was supported by a *Pillar* of *Iron*, of the bignesse of ones *Arme*, in the midst of the *Chamber*; Which if you had stricke, it would make a little flat *Noise* in the *Roome* where it was stricke; But it would make a great *Bombe* in the *Chamber* beneath.

The *Sound* which is made by *Buckets* in a *well*, when they touch vpon the *water*; Or when they strike vpon the side of the *well*; Or when two *Buckets* dash the one against the other; These *Sounds* are deeper and fuller, than if the like *Percussion* were made in the *Open Aire*. The *Cause* is, the *Penning* and *Enclosure* of the *Aire*, in the *Concaue* of the *well*.

Barrels placed in a *Roome* vnder the *Floare* of a *Chamber*, make all *Noises* in the same *Chamber*, more *Full* and *Resounding*.

So that there be *five wayes* (in generall) of *Maioration* of *Sounds*: *Enclosure Simple*; *Enclosure with Dilatation*; *Communication*; *Reflexion Concurrent*; and *Approach to the Sensory*.

For *Exility* of the *Voice*, or other *Sounds*: It is certaine, that the *Voice* doth passe thorow *Solid* and *Hard Bodies*, if they be not too thick. And thorow *water*, which is likewise a very *Close Body*, and such an one, as letteth not in *Aire*. But then the *Voice*, or other *Sound*, is reduced, by such passage, to a great *weaknesse*, or *Exilitie*. If therefore you stop the *Holes* of a *Hawkes Bell*, it will make no *Ring*, but a flat *Noise*, or *Rattle*. And so doth the *Aërites*, or *Eagles Stone*, which hath a little *Stone* within it.

And as for *water*, it is a certaine *Triall*: Let a *Man* goe into a *Bath*, and take a *Pail*, and turne the *Bottom* vpward and carry the *Mouth* of it, (Euen,) downe to the *Leuell* of the *water*; and so presse it downe vnder the *water*, some handfull and an halfe, still keeping it euen, that it may not tilt on either side, & so the *Aire* get out: then let him that is in the *Bath*, diue with his *Head* so far vnder *water*, as he may put his head into the *Pail*, & there will come as much *Aire* bubling forth, as will make

Roome for his Head. Then let him speak; & any that shall stand without, shall heare his *Voice* plainly; but yet made extreme sharp and exile, like the *Voice* of *Puppets*. But yet the *Articulate Sounds* of the words will not be confounded. Note that it may be much more handsomly done, if the *Paile* be put ouer the Mans head aboue water, and then he cower downe, and the *Paile* be pressed downe with him. Note that a man must kneele or sit, that he may be lower than the water. A man would think, that the *Sicilian Poet* had knowledge of this *Experiment*; For he saith; That *Hercules Page Hylus* went with a Waterpot, to fill it at a pleasant *Fountaine*, that was neere the Shore, and that the *Nymphs* of the *Fountaine* fell in loue with the Boy, & pulled him vnder water, keeping him aliue; And that *Hercules* missing his *Page*, called him by his Name, aloud, that all the shore rang of it, and that *Hylas* from within the Water, answered his Master; But (that which is to the present purpose) with so small and exile a *Voice*, as *Hercules* thought he had beene three miles off, when the *Fountaine* (indeed) was fast by.

156

In *Lutes* and *Instruments* of *Strings*, if you stop a *String* high (where by it hath lesse scope to tremble) the *Sound* is more *Treble*, but yet more dead.

157

Take two *Sawcers*, and strike the edge of the one against the bottom of the other, within a *Paile* of water; And you shall finde, that as you put the *Sawcers* lower and lower, the *Sound* groweth more flat; euen while Part of the *Sawcer* is aboue the Water; But that Flatnesse of *Sound* is ioyned with a Harshnesse of *Sound*; which (no doubt) is caused by the inequality of the *Sound*, which commeth from the part of the *Sawcer* vnder the water, and from the Part aboue. But when the *Sawcer* is wholly vnder the water, the *Sound* becommeth more cleare, but farre more low; And as if the *Sound* came from a farre off.

158

A *Soft Body* dampeth the *Sound*, much more than a *Hard*; As if a Bell hath Cloth, or Silk wrapped about it, it deadeth the *Sound* more, than if it were Wood. And therefore in *Clericals*, the *Keyes* are lined; And in *Colleges* they vse to line the *Tablemen*.

159

Triall was made in a *Recorder*, after these seuerall manners. The Bottom of it was set against the *Palme* of the Hand; stopped with Wax round about; set against a *Damaske Cushion*; Thrust into Sand; Into *Ashes*; Into Water (halfe an inch vnder the Water;) Close to the Bottom of a *Siluer Basin*; And still the *Tone* remained: but the Bottom of it was set against a *Woollen Carpet*; A *Lining* of *Plush*; A *Lock* of *Wooll*, (though loosely put in;) Against *Snow*; And the *Sound* of it was quite deaded, and but *Breath*.

160

Iron Hot, produceth not so full a *Sound*, as when it is Cold; For while it is hot, it appeareth to be more soft, and lesse resounding. So likewise warme water, when it falleth, maketh not so full a *Sound*, as Cold: And I conceiue it is softer, and neerer the Nature of *Oile*; For it is more slippery; As may be perceiued, in that it scowreth better.

161

Let there be a *Recorder* made, with two *Fipples*, at each end one; The

Trunke

Trunke of it of the length of two *Recorders*, and the Holes answerable toward each end; And let two play the same lesson vpon it, at an Vnison: And let it be noted, whether the *Sound* be confounded, or amplified; or dulled. So likewise let a *Crosse* bee made, of two Trunkes (thorow-out) hollow; And let two speake, or sing, the one long-waies, the other trauerse: And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also giue light to the *Mixture of Sounds*, whereof we shall speake hereafter.

A *Bellows* blowne in at the *Hole* of a *Drumme*, and the *Drum* then stricken, maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindereth the Issue of the *Sound*; And partly for that it maketh the *Aire*, being blowne together, lesse moueable.

THe *Loudnesse* and *Softnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exilitie* of *Sounds*; For a *Base String*, though softly stricken, giueth the greater *Sound*; But a *Treble String*, if hard stricken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more *Aire*; And the *Treble* lesse *Aire*, but with a sharper percussion.

It is therefore the *Strength* of the *Percussion*, that is a Principall *Cause* of the *Loudnesse* or *Softnesse* of *Sounds*: As in knocking harder or softer; Winding of a Horne stronger or weaker; Ringing of a Hand-bell harder or softer, &c. And the *strength* of this *percussion* consisteth as much, or more, in the *Hardnesse* of the *Body percussed*, as in the *Force* of the *Body percussing*: For if you strike against a Cloth, it will giue a lesse *Sound*; If against Wood, a greater; If against Metall, yet a greater; And in Metals, if you strike against Gold, (which is the more pliant, it giueth the flatter *Sound*; If against Siluer, or Brasse, the more Ringing *Sound*. As for *Aire*, where it is strongly pent, it matcheth a *Hard Bodie*. And therefore we see in discharging of a *Peece*, what a great *Noise* it maketh. We see also, that the Charge with Bullet; Or with paper wet, and hard stopped; Or with powder alone, rammed in hard; maketh no great difference in the *Loudnesse* of the Report.

The *Sharpnesse* or *Quicknesse* of the *Percussion*, is a great *Cause* of the *Loudnesse*, as well as the *strength*: As in a Whip, or Wand, if you strike the *Aire* with it, the sharper and quicker you strike it, the louder *Sound* it giueth. And in playing vpon the *Lute*, or *Virginals*, the quicke stroke or Touch, is a great life to the *Sound*. The *Cause* is, for that the Quicke Striking cutteth the *Aire* speedily; whereas the Soft Striking doth rather beat than cut.

The *Communication* of *Sounds* (as in Bellies of *Lutes*, Emptic Vessels, &c.) hath beene touched obiter, in the *Maioration* of *Sounds*; But it is fit also to make a *Title* of it apart.

The

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Experiments
in Consort
touching the
Loudnesse or
Softnesse of
Sounds; and
their Carriage at
longer or shorter
Distance.

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165

Experiments
in Consort tou-
ching the Com-
munication of
Sounds.

166

The *Experiment* for greatest Demonstration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; Where if you strike with a Hammer vpon the Vpper Part, and then vpon the Midst, and then vpon the Lower, you shall finde the *Sound* to bee more Treble, and more Base, according vnto the Concaue, on the Inside; though the Percussion bee onely on the Out-side.

167

When the *Sound* is created betweene the *Blast* of the *Mouth*, and the *Aire* of the *Pipe*, it hath neuerthelesse some *Communication* with the Matter of the Sides of the *Pipe*, and the Spirits in them contained; for in a *Pipe* or *Trumpet*, of Wood, and Brasse, the *Sound* will bee diuers; So if the *Pipe* be couered with *Cloth*, or *Silke*, it will giue a diuers *Sound*, from that it would doe of it selfe; So, if the *Pipe* bee a little wet on the Inside, it will make a differing *Sound*, from the same *Pipe* dry.

168

That *Sound* made within *Water*, doth communicate better with a hard Body thorow *water*, than made in *Aire*, it doth with *Aire*; Vide *Experimentum* 134.

Experiments
in Consort,
touching Equa-
lity, and Inequa-
lity of Sounds.

Wee haue spoken before (in the *Inquisition* touching *Musicke*,) of *Musicall Sounds*, whereunto there may be a Concord or Discord in two Parts; Which Sounds we call *Tones*: And likewise of *Immusicall Sounds*; And haue given the *Cause*, that the *Tone* proceedeth of *Equality*, and the other of *Inequality*: And wee haue also exprest there, what are the *Equall Bodies* that giue *Tones*, and what are the *Vnequall* that giue none. But now wee shall speake of such *Inequality* of *Sounds*, as proceedeth, not from the Nature of the Bodies themselves, but is *Accidentall*; Either from the *Roughnesse*, or *Obliquitie* of the *Passage*; Or from the *Doubling* of the *Percuient*; Or from the *Trepidation* of the *Motion*.

169

A *Bell*, if it haue a *Rift* in it, whereby the *Sound* hath not a cleare *Passage*, giueth a *Hoarse* and *Larring Sound*; So the *Voice* of *Man*, when by cold taken the *Wefill* groweth rugged, and (as we call it) furred, becommeth hoarse. And in these two *Instances*, the *Sounds* are *Ingrate*; because they are meere-ly vnequall: But, if they bee *Vnequall* in *Equality*, then the *sound* is *Gratefull*, but *Purling*.

170

All *Instruments*, that haue either *Returns*, as *Trumpets*; Or *Flexions*, as *Cornets*; Or are *Drawne up*, and *put from*, as *Sackbuts*; haue a *Parling Sound*: But the *Recorder* or *Flute*, that haue none of these *Inequalities*, giue a cleare *Sound*. Neuerthelesse, the *Recorder* it selfe, or *Pipe* moistened a little in the Inside, foundeth more solemnly, and with a little *Purling*, or *Hissing*. Again, a *wreathed String*, such as are in the Base Strings of *Bandoraes*, giueth also a *Parling Sound*.

171

But a *Lute-string*, if it be meere-ly *Vnequall* in his Parts, giueth a *Harsh* and

and untuneable *Sound*; which *Strings* wee call *False*, being bigger in one Place than in another; And therefore *wire-strings* are neuer *False*. We see also, that when wee try a *False Lute-string*, wee vse to extend it hard betwene the fingers, and to fillip it; And if it giueth a double *Species*, it is *True*; But if it giueth a *Treble*, or more, it is *False*.

Waters, in the *Noise* they make as they run, represent to the Eare a *Trembling Noise*; And in *Regalls*, (where they haue a *Pipe*, they call the *Nightingale-Pipe*, which containeth *water*) the *Sound* hath a continuall *Trembling*: And Children haue also little Things they call *Cocks*, which haue *Water* in them; And when they blow, or whistle in them, they yeeld a *Trembling Noise*; Which *Trembling of Water*, hath an affinity with the Letter *L*. All which *Inequalities of Trepidation*, are rather pleasant, than otherwise.

All *Base Notes*, or very *Treble Notes*, giue an *Asper Sound*; For that the *Base* striketh more *Aire*, than it can well strike equally: And the *Treble* cutteth the *Aire* so sharpe, as it returneth too swift, to make the *Sound* Equall: And therefore a *Meane* or *Tenor*, is the sweetest Part.

We know nothing, that can at pleasure make a *Musical* or *Immusical Sound*, by voluntary *Motion*, but the *Voice of Man*, and *Birds*. The Cause is (no doubt) in the *Weasill* or *Wind-pipe*, (which we call *Aspera Arteria*,) which being well extended, gathereth *Equality*; As a *Bladder* that is wrinckled; if it bee extended, becommeth smooth. The Extension is alwayes more in *Tones*, than in *Speech*: Therefore the *Inward Voice* or *whisper* can neuer giue a *Tone*: And in *Singing*, there is (manifestly) a greater *Working* and *Labour* of the *Throat*, than in *Speaking*; As appeareth in the *Thrusting out*, or *Drawing in* of the *Chin*, when we sing.

The *Humming of Bees*, is an *Vnequall Buzzing*. And is conceiued, by some of the *Ancients*, not to come forth at their Mouth, but to bee an *Inward Sound*; But (it may bee) it is neither; But from the motion of their *Wings*; For it is not heard but when they stirre.

All *Metalls quenched in water*, giue a *Sibilation* or *Hissing Sound*; (which hath an Affinity with the letter *Z*.) notwithstanding the *Sound* be created betwene the *water* or *Vapour*, and the *Aire*. Seeching also, if there be but small store of *water* in a *Vessell*, giueth a *Hissing Sound*; But *Boyling* in a full *Vessell*, giueth a *Bubbling Sound*, drawing somewhat neere to the *Cockes* vsed by Children.

Triall would be made, whether the *Inequality*, or *Interchange* of the *Medium*, will not produce an *Inequality of Sound*; As if three *Bells* were made one within another, and *Aire* betwixt Each; and then the outermost *Bell* were Chimed with a *Hammer*, how the *Sound* would differ from a *Simple Bell*. So likewise take a *Plate of Brasse*, and a planke of *wood*, and ioyn them close together, and knocke ypon one of them, and see if they doe not giue an *Vnequall Sound*. So make two or three *Partitions of wood* in a *Hogshead*, with *Holes* or *Knots* in them; And marke the difference of their *Sound*, from the *Sound* of an *Hogshead*, without such *partitions*.

It

Experiments
in Confort,
touching the
more Treble, and
the more Base
Tones, or Musi-
call Sounds.

178

It is eident, that the *Percussion* of the Greater quantity of *Aire*, causeth the *Baser Sound*; And the lesse Quantity, the more *Treble Sound*. The *Percussion* of the Greater Quantity of *Aire*, is produced by the Greatnesse of the *Body Percussing*; By the *Latitude* of the *Concave*, by which the *Sound* passeth; and by the *Longitude* of the same *Concave*. Therefore we see that a *Base string*, is greater than a *Treble*; A *Base Pipe* hath a greater Bore than a *Treble*; And in *Pipes*, and the like, the lower the Note Holes be, and the further off from the Mouth of the *Pipe*, the more *Base Sound* they yeeld; And the neerer the Mouth, the more *Treble*. Nay more, if you strike an *Entire Body*, as an *Andiron* of *Brasse*, at the Top, it maketh a more *Treble Sound*; And at the Bottome a *Baser*.

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It is also eident, that the *Sharper* or *Quicker Percussion* of *Aire* causeth the more *Treble Sound*; And the *Slower* or *Heavier*, the more *Base Sound*. So we see in *Strings*, the more they are wound vp, and strained; (And thereby giue a more quicke start backe;) the more *Treble* is the *Sound*; And the flacker they are, or lesse wound vp, the *Baser* is the *Sound*. And therefore a Bigger *String* more strained, and a lesser *String*, lesse strained, may fall into the same *Tone*.

180

Children, Women, Eunuchs have more small and shrill *Voices* than *Men*. The Reason is, not for that *Men* haue greater Heat, which may make the *Voice* stronger, (for the strength of a *Voice* or *Sound*, doth make a difference in the *Loudnesse* or *Softnesse*, but not in the *Tone*;) But from the Dilatation of the Organ; which (it is true) is likewise caused by Heat. But the Cause of *Changing* the *Voice*, at the yeares of Puberty, is more obscure. It seemeth to be, for that when much of the Moisture of the Body which did before irrigate the Parts, is drawne downe to the Spermatieall vessels; it leaueth the Body more hot than it was; whence commeth the Dilatation of the Pipes: For we see plainly, all Effects of Heat, doe then come on; As Pilosity, more Roughnesse of the Skin, Hardnesse of the Flesh, &c.

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The Industry of the *Musitian*, hath produced two other Meanes of *Straining*, or *Intension* of *Strings*, besides their *winding vp*. The one is the *Stopping* of the *String* with the *Finger*; As in the Neckes of Lutes, Viols, &c. The other is the *Shortnesse* of the *String*; As in Harps, Virginalls, &c. Both these haue one, and the same reason; for they cause the *String* to giue a quicker start.

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In the *straining* of a *String*, the further it is strained, the lesse *Superstraining* goeth to a *Note*; For it requireth good *Winding* of a *String*, before it will make any *Note* at all: And in the Stops of Lutes, &c. the higher they goe, the lesse Distance is betweene the Frets.

183

If you fill a *Drinking Glasse* with *water*, (especially one sharpe below, and Wide aboue,) and fillip vpon the Brim, or Out-side; And after empty Part of the *water*, and so more and more, and still try the *Tone* by Filipping; you shall find the *Tone* fall, and bee more *Base*, as the *Glasse* is more Empty.

The

Experimentes
in Confort,
touching the
Proportion of
Treble and Base
Tones.

The Iust and Measured *Proportion* of the *Aire Percussed*, towards the *Basenesse* or *Treblenesse* of *Tones*, is one of the greatest *Secrets* in the *Contemplation* of *Sounds*. For it discovereth the true *Coincidence* of *Tones* into *Diapasons*; Which is the *Returne* of the same *Sound*. And so of the *Concords* and *Discords*, betweene the *Unison*, and *Diapason*; Which we have touched before, in the *Experiments* of *Musicke*; but thinke fit to relume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may bee found out in the *Proportion* of the *Winding* of *Strings*: In the *Proportion* of the *Distance* of *Frets*; And in the *Proportion* of the *Concaue* of *Pipes*, &c. But most commodiously in the last of these.

Try therefore the *Winding* of a *String* once about, as soone as it is brought to that *Extension*, as will giue a *Tone*; And then of twice about; And thrice about, &c. And marke the *Scale* or *Difference* of the *Rise* of the *Tone*: Whereby you shall discover, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimension* of the *Winding*; And the *Proportion* likewise of the *Sound* towards the *String*, as it is more or lesse strained. But note that to measure this, the way will bee, to take the *Length* in a right *Line* of the *String*, vpon any *Winding* about of the *Peg*.

As for the *Stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the first *Stop* of the *String*, vnto such a *Stop* as shall produce a *Diapason* to the former *Stop*, vpon the same *String*.

But it will best (as it is said) appeare, in the *Bores* of *Wind-Instruments*: And therefore cause some halfe dozen *Pipes*, to be made, in length, and all things else, alike, with a single, double, and so on to a sextuple *Bore*; And so marke what *Fall* of *Tone* euery one giueth. But still in these three last *Instances*, you must diligently obserue, what *Length* of *String*, or *Distance* of *Stop*, or *Concaue* of *Aire*, maketh what *Rise* of *Sound*. As in the last of these (which (as wee said) is that, which giueth the aptest demonstration,) you must set downe what *Encrease* of *Concaue* goeth to the *Making* of a *Note* higher; And what of two *Notes*; And what of three *Notes*; And so vp to the *Diapason*: For then the great *Secret* of *Numbers*, and *Proportions*, will appeare. It is not vnlike, that those that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewise *Bell-Founders* in fitting the *Tune* of their *Bells*. So that Enquiry may saue *Triall*. Surely, it hath beene obserued by one of the *Ancients*, that an *Empty Barrell* knocked vpon with the finger, giueth a *Diapason* to the *Sound* of the like *Barrell full*; But how that should bee, I doe not well vnderstand; For that the knocking of a *Barrell full*, or *Empty*, doth scarce giue any *Tone*.

There

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There is required some sensible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it selfe, which is the *Passive*: And that it bee not too neare, but at a distance. For in a *Recorder*, the three vppermost Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the first three. And the like (no doubt) is required in the *Winding* or *Stopping* of *Strings*.

Experiments
in Confort
touching Exte-
riour, and Inte-
riour Sounds.

There is another Difference of *Sounds*, which wee will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Base*, nor *Treble*. Nor it is not *Musical*, nor *Immusical*. Though it bee true, that there can bee no *Tone* in an *Interiour Sound*: But on the other side, in an *Exteriour Sound*, there may bee both *Musical* and *Immusical*. Wee shall therefore enumerate them, rather than precilely distinguish them; Though (to make some Adumbration of that wee meane) the *Interiour* is rather an *Impulsion* or *Confusion* of the *Aire*, than an *Elision* or *Section* of the same. So as the *Percussion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*.

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In *Speech* of *Man*, the *whispering*, (which they call *Susurrus* in *Latine*,) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can neuer make a *Tone*, nor sing in *whispering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellows*, or *wind*, (though loud) is an *Interiour Sound*; But the *Blowing* thorow a *Pipe*, or *Concane*, (though soft) is an *Exteriour*. So likewise, the greatest *windes*, if they haue no *Coarctation*, or blow not hollow, giue an *Interiour Sound*; The *Whistling* or hollow *Winde* yeeldeth a *Singing*, or *Exteriour Sound*; The former being pent by some other *Body*; The latter being pent in by his owne *Density*: And therefore wee see, that when the *Winde* bloweth hollow, it is a *Signe* of *Raine*. The *Flame*, as it moueth within it selfe, or is blowne by a *Bellows*, giueth a *Murmur* or *Interiour Sound*.

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There is no *Hard Body*, but stricke against another *Hard Body*, will yeeld an *Exteriour Sound*, greater or lesser: Inſomuch as if the *Percussion* bee other-ſoft, it may induce a *Nullity* of *Sound*; But neuer an *Interiour Sound*; As when one treadeth ſo ſoftly, that he is not heard.

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Where the *Aire* is the *Percutient*, pent, or not pent, againſt a *Hard Body*, it neuer giueth an *Exteriour Sound*; As if you blow ſtrongly with a *Bellows* againſt a *Wall*.

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Sounds (both *Exteriour* and *Interiour*,) may bee made as well by *Suction*, as by *Emission* of the *Breath*: As in *whistling*, or *Breathing*.

Experiments
in Confort tou-
ching Articula-
tion of Sounds.

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IT is euident, and it is one of the ſtrangeſt *Secrets* in *Sounds*, that the *whole Sound* is not in the whole *Aire* onely; But the *whole Sound* is alſo in euery ſmall *Part* of the *Aire*. So that all the curious *Diuersity* of *Articulate*

culate Sounds, of the Voice of Man, or Birds, will enter at a small Cranny, Inconfused.

The *Vnequall Agitation* of the *Winds*, and the like, though they bee materiall to the Carriage of the *Sounds*, further, or lesse way; yet they doe not confound the *Articulation* of them at all, within that distance that they can be heard; Though it may be, they make them to be heard lesse Way, than in a Still, as hath beene partly touched.

Over-great Distance confoundeth the *Articulation* of *Sounds*; As we see, that you may heare the *Sound* of a Preachers voice, or the like, when you cannot distinguish what he saith. And one *Articulate Sound*, will confound another; As when many speake at once.

In the *Experiment* of *Speaking under water*, when the Voice is reduced to such an Extreme Exility, yet the *Articulate Sounds*, (which are the *words*), are not confounded; as hath beene said.

I conceive, that an *Extreme Small*, or an *Extreme Great Sound*, cannot be *Articulate*; But that the *Articulation* requireth a *Mediocrity* of *Sound*: For that the *Extreme Small Sound* confoundeth the *Articulation* by *Contracting*; And the *Great Sound*, by *Dispersing*: And although (as was formerly said) a *Sound Articulate*, already created, will be contracted into a small Cranny; yet the first *Articulation* requireth more Dimension.

It hath beene obserued, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewise in the Roofe, a Preacher cannot be heard so well, as in the like Places not so Vaulted. The Cause is, for that the *Subsequent words* come on, before the *Precedent words* vanish: And therefore the *Articulate Sounds* are more confused, though the *Grosse* of the *Sound* be greater.

The *Motions* of the *Tongue*, *Lips*, *Throat*, *Pallat*, &c. which goe to the *Making* of the severall *Alphabetical Letters*, are worthy Enquiry, and pertinent to the present *Inquisition* of *Sounds*: But because they are subtrill, and long to describe, we will refer them ouer, and place them amongst the *Experiments* of *Speecch*. The *Hebrewes* haue beene diligent in it, and haue assigned, which *Letters* are *Labiall*, which *Dental*, which *Gutturall*, &c. As for the *Latines*, and *Grecians*, they haue distinguished betweene *Semi-vowels*, and *Mutes*; And in *Mutes*, betweene *Muta Tenues*, *Media*, and *Aspirata*; Not amisse; But yet not diligently enough. For the speciall *Strokes*, and *Motions*, that create those *Sounds*, they haue little enquired: As that the *Letters*, *B.P.F.M.* are not expressed, but with the *Contracting*, or *Shutting* of the *Mouth*; That the *Letters* *N.* and *B.* cannot be pronounced, but that the *Letter* *N.* will turne into *M.* As *Hecatonba*, will be *Hecatomba*. That *M.* and *T.* cannot be pronounced together, but *P.* will come betweene; as *Emtus*, is pronounced *Emptus*; And a Number of the like. So that if you enquire to the full; you will finde, that to the *Making* of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*.

The *Lungs* are the most Spongy Part of the Body; And therefore ablest to contract, and dilate it selfe; And where it contracteth it selfe,

F

it

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it expelleth the *Aire*; which thorow the *Artire*, *Throat*, and *Mouth*, maketh the *Voice*: But yet *Articulation* is not made, but with the helpe of the *Tongue*, *Pallat*, and the rest of those they call *Instruments* of *voice*.

There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that haue no *Voice Articulate*; and diuers *Letters* of *Articulate Voices*: And commonly Men haue giuen such Names to those *Sounds*, as doe allude vnto the *Articulate Letters*. As *Trembling* of *Water* hath Resemblance with the *Letter L*; *Quenching* of *Hot Metals*, with the *Letter Z*; *Snarling* of *Dogs*, with the *Letter R*; The *Noise* of *Scratchowles*, with the *Letter Sh*; *Voice* of *Cats*, with the *Dypthong Eu*; *Voice* of *Cuckoes*, with the *Dypthong Ou*; *Sounds*, of *Strings*, with the *Letter Ng*: So that if a Man, (for Curiosity, or Strangenesse sake) would make a *Puppet*, or other Dead Body, to pronounce a word;

Let him consider, on the one Part, the Motion of the *Instruments* of *Voice*; and on the other part the like *Sounds* made in *Inanimate Bodies*; And what Conformity there is that causeth the Similitude of *Sounds*; And by that hee may minister light to that Effect.

(* * *)

NATV-



NATVRALL HISTORIE.

III. Century.



L L *Sounds* (whatsoever) moue Round; That is to say; On all Sides; *Vpwards*; *Downwards*; *Forwards*; and *Backwards*. This appeareth in all *Instances*.

Sounds doe not require to be conueyed to the *Sense*, in a *Right Line*, as *Visibles* doe, but may bee *Arched*; Though it be true, they moue strongest in a *Right line*, which neuertheless is not caused by the *Righnesse* of the *Line*, but by the Shortnesse of the distance; *Linea recta breuissima*. And therefore wee see, if a *wall* bee betweene, and you speake on the one Side, you heare it on the other; Which is not because the *Sound* passeth thorow the *wall*; but *Archeth* ouer the *wall*.

If the *Sound* bee *Stopped* and *Repercussed*, it commeth about on the other Side, in an *Oblique Line*. So, if in a *Coach*, one Side of the Boot be downe, and the other vp; And a Beggar beg on the Close Side; you would thinke that he were on the Open Side. So likewise, if a or *Bell Clocke*, be (for Example) on the North-side of a Chamber; And the Window of that Chamber be vpon the South; Hee that is in the Chamber will thinke the *Sound* came from the South.

Sounds though they *spread round*, (so that there is an *Orbe* or *Sphericall Area* of the *Sound*;) yet they moue strongest, and goe furthest in the *Fore-lines*, from the first Locall Impulsion of the Aire. And therefore in *Preaching*, you shall heare the *Preachers* Voice, better before the Pulpit than behinde it, or on the Sides, though it stand open. So a *Harquebuz*, or *Ordinance*, will be further heard, forwards, from the Mouth of the *Pece*, than back wards, or on the Sides.

It may bee doubted, that *Sounds* doe moue better *Downwards*

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Experiments
in Consort
touching the
Motions of
Sounds, in what
Lines they are
Circular, Ob-
lique, Straight;
Vpwards, down-
wards; For-
wards, Back-
wards.

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than Vpwards. *Pulpits* are placed high about the People. And when the Ancient *Generall* spake to their Armies, they had euer a Mount of Turfe cast vp, whereupon they stood: But this may bee imputed to the Stops and Obstacles, which the voice meeteth with, when one speaketh vpon the leuell. But there seemeth to bee more in it: For it may bee, that *Spirituall Species*, both of *Things Visible* and *Sounds*, doe moue better *Downwards* than *Upwards*. It is a strange Thing, that to Men standing below on the Ground, those that bee on the Top of Pauls, seeme much lesse than they are, and cannot bee knowne; But to Men aboue, those below seeme nothing so much lessened, and may be knowne, yet it is true, that all things to them aboue, seeme also somewhat contracted, and Better collected into Figure: As *Knots* in *Gardens* shew best from an Vpper-window, or *Tartas*.

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But to make an exact Triall of it, let a Man stand in a *Chamber*, not much aboue the Ground, and speake out at the window, thorow a *Trunke*, to one standing on the ground, as softly as hee can, the other laying his Eare close to the *Trunke*: Then *viâ versa*, let the other speake *below* keeping the same Proportion of Softnesse; And let him in the *Chamber* lay his Eare to the *Trunke*: And this may bee the aptest Meanes, to make a Iudgement, whether *Sounds* descend, or ascend, better.

Experiments
in Consort,
touching the
Lasting & Peri-
shing of Sounds;
And touching
the Time they
require to their
Generation, or
Delation.

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After that *Sound* is created (which is in a moment) wee finde it continueth some small time, melting by little and little. In this there is a wonderfull Errour amongst Men, who take this to bee a *Continuance* of the First *Sound*: whereas (in truth) it is a *Renouation*, and not a *Continuance*: For the *Body percussed*, hath by reason of the *Percussion*, a *Trepidation* wrought in the *Minute Parts*; and so reneweth the *Percussion* of the *Aire*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String stricken, which is thought to be a *Continuance*, ceaseth as soon as the Bell or String are touched. As in a Virginnall, as soone as euer the lacke falleth; and toucheth the String, the Sound ceaseth; And in a Bell after you haue chimed vpon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish, that there are two *Trepidations*: The one Manifest and Locall; As of the Bell, when it is penfile: The other Secret, of the Minute Parts; such as is described in the ninth Instance. But it is true, that the *Locall* helpeth the *Secret* greatly. Wee see likewise that in Pipes, and other wind-Instruments, the *Sound* lasteth no longer, than the breath bloweth. It is true, that in Organs, there is a confused Murmur for a while, after you haue plaied; But that is but while the Bellowes are in Falling.

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It is certaine, that in the *Noise* of great *Ordnance*, where many are shot off together, the *Sound* will bee carried, (at the least) twenty Miles vpon the Land; and much further vpon the Water. But then it will come to the Eare; Not in the Instant of the Shooting off, but it will come an Houre, or more later. This must needs bee a *Continuance* of the First *Sound*; For there is no *Trepidation* which should renew it. And the

the Touching of the *Ordnance* would not extinguish the *Sound* the sooner : So that in great *Sounds* the *Continuance* is more than Momentary.

To try exactly the time wherein *Sound* is *Delayed*, Let a Man stand in a Steeple, and haue with him a Taper ; And let some Vaile bee put before the Taper ; And let another man stand in the Field a Mile off. Then let him in the Steeple strike the Bell ; And in the same Instant with-draw the Vaile ; And so let him in the Field tell by his Pulse what distance of *Time* there is, betweene the *Light scene*, and the *Sound Heard* : For it is certaine that the *Delation* of Light is in an Instant. This may bee tried in farre greater Distances, allowing greater *Lights* and *Sounds*.

It is generally knowne and obserued, that *Light* and the *Object* of *Sight*, move swifter than *Sound* ; For wee see the *Flash* of a Peece is scene sooner than the *Noise* is heard. And in hewing wood, if one be some distance off, he shall see the Arme lifted vp for a second Stroke, before hee heare the Noise of the first. And the greater the Distance, the greater is the Preuention : As wee see in Thunder which is farre off ; where the Lightning Precedeth the Cracke a good space.

Colours, when they represent themselves to the Eye, fade not, nor melt not by Degrees, but appeare still in the same strength : But *Sounds* melt, and vanish, by little and little. The cause is, for that *Colours* participate nothing with the *Motion* of the *Aire* ; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire* (as a Cause *Sine qua non*,) in that, it perisheth so suddenly ; For in euery Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it selfe ; which the *water* also doth, but nothing so swiftly.

In the Trialls of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing by the Sides* of a Body, for the *Passing thorow* a Body : And therefore you must make the *Intercepting* Body very close ; For *Sound* will passe thorow a small Chincke.

Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *water*, thorow a *Wall*, thorow *Metall*, as in Hawkes Bells stopped, &c.) the *Hard*, or *Close Body*, must bee but thin and small ; For else it deadeth and extinguisheth the *Sound* vterly. And therefore in the *Experiment* of *Speaking in Aire vnder water*, the Voice must not be very deepe within the *water* : For then the *Sound* pierceth not. So if you speake on the further side of a *Close wall*, if the *Wall* be very thicke, you shall not be heard : And if there were an Hogthead empty, whereof the Sides were some two Foot thicke, and the bung-hole stopped, I conceiue the Resounding *Sound*, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none, But onely you shall heare the *Noise* of the Outward Knocke, as if the Vessel were full.

Experiments
in Consort
touching the
Passage, and
Interceptions of
Sounds.

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It is certaine, that in the *Passage of Sounds*, thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard Body it selfe, doth cooperate; But much better, when the sides of that *Hard Body* are strucke, than when the Percussion is only within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stopped vp, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax; And then shake the Glasse, and see whether the Bell giue any *Sound* at all, or how weake; But note, that you must in stead of the Threed take a Wire; Or else let the Glasse haue a great Belly; lest when you shake the Bell, it dash vpon the Sides of the Glasse.

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It is plaine, that a very *Long*, and *Down-right Arch*, for the *Sound* to passe, will extinguish the *Sound* quite; So that that *Sound*, which would be heard ouer a Wall, will not be heard ouer a Church; Nor that *Sound*, which will be heard, if you stand some distance from the Wall, will be heard if you stand close vnder the Wall.

215

Soft and *Foraminous Bodies*, in the first Creation of the *Sound*, will dead it; For the Striking against Cloth, or Furre, will make little *Sound*; As hath beene said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*; As wee see, that Curtaines, and Hangings, will not stay the *Sound* much; But Glasse-windowes, if they be very Close, will checke a *Sound* more, than the like Thickness of Cloth. Wee see also, in the Rumbling of the Belly, how easily the *Sound* passeth thorow the Guts, and Skin.

216

It is worthy the Enquiry, whether *Great Sounds* (As of Ordnance, or Bells) become not more *weake*, and *Exile*, when they passe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds* (it may be) may passe thorow *Small Crannies*, not confused; But the *Magnitude* of the *Sound* (perhaps) not so well.

Experiments
in Consort,
touching the
Medium of
Sounds.

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THE *Mediums* of *Sounds* are *Aire*; *Soft* and *Porous Bodies*; Also *water*. And *Hard Bodies* refuse not altogether to be *Medinms* of *Sounds*. But all of them are dull and vnapt *Deferents*, except the *Aire*.

In *Aire*, the Thinner or Drier: *Aire*, carrieth not the *Sound* so well, as the more Dense; As appeareth in *Night Sounds*; And *Evening Sounds*; And *Sounds* in moist Weather, and Southerne Winds. The reason is already mentioned in the Title of *Maioration of Sounds*; Being for that *Thin Aire* is better pierced; but *Thicke Aire* preserveth the *Sound* better from Wast; Let further Triall be made by Hollowing in Mists, and Gentle Showers: For (it may be) that will somewhat dead the *Sound*.

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How farre forth *Flame* may be a *Medium* of *Sounds* (especially of such *Sounds* as are created by *Aire*, and not betwixt *Hard Bodies*) let it be tried, in *speaking* where a *Bonfire* is betweene; But then you must allow, for some disturbance, the *Noise* that the *Flame* it selfe maketh.

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Whether any other *Liquors*, being made *Mediums*, cause a Diversity of *Sound* from *water*; it may be tried: As by the Knapping of the Tongs; Or Striking of the Bottome of a Vessell, filled either with *Milke*,

or with Oyle, which though they be more light, yet are they more vnequall Bodies than Aire.

Of the Natures of the Mediums, we haue now spoken; As for the Disposition of the said Mediums, it doth consist in the Penning, or not Penning of the Aire; Of which wee haue spoken before, in the Title of Delation of Sounds: It consisteth also in the Figure of the Concaue, thorow which it passeth; Of which wee will speake next.

How the *Figures* of Pipes, or Concaues, thorow which Sounds passe; Or of other Bodies different; conduce to the Variety and Alteration of the Sounds; Either in respect of the Greater Quantity, or lesse Quantity of Aire, which the Concaues receiue; Or in respect of the Carrying of Sounds longer or shorter way; Or in respect of many other Circumstances; they haue bene touched, as falling into other Titles. But those Figures, which we now are to speake of, we intend to be, as they concerne the Lines thorow which Sound passeth; As Straight; Crooked; Angular; Circular; &c.

Experiments
in Consort,
what the Fi-
gures of the
Pipe, or Con-
caue, or the
Bodies Differ-
conduce to the
Sounds.

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The Figure of a Bell partaketh of the *Pyramis*, but yet comming off, and dilating more suddenly. The Figure of a Hunters Horne, and Cornet, is oblique; yet they haue likewise *Straight Hornes*; which if they be of the same Bore with the Oblique, differ little in Sound; Saue that the Straight require somewhat a stronger Blast. The Figures of *Recorders*, and *Flutes*, and Pipes are straight; But the Recorder hath a lesse Bore, and a greater; Above, and below. The *Trumpet* hath the Figure of the Letter S: which maketh that Purling Sound, &c. Generally, the Straight Line hath the cleaneft and roundest Sound, and the Crooked the more Hoarse, and larring.

222

Of a *Sinuous Pipe*, that may haue some foure Flexions, Triall would be made. Likewise of a Pipe, made like a *Crosse*, open in the middest. And so likewise of an *Angular Pipe*: And see what will be the Effects of these seuerall Sounds. And so againe of a *Circular Pipe*: As if you take a Pipe perfect Round, and make a Hole whereinto you shall blow; And another Hole not farre from that, But with a *Traverse* or Stop between them; So that your breath may goe the Round of the Circle, and come forth at the second Hole. You may trie likewise *Percussions* of Solide Bodies of seuerall Figures; As *Globes*, *Flats*, *Cubes*, *Crosses*, *Triangles*, &c. And their *Combinations*, As Flat against Flat; And *Conuex* against *Conuex*; And *Conuex* against Flat, &c. And marke well the diuersities of the Sounds. Trie also the difference in Sound of seuerall *Crafftitudes* of Hard Bodies percussed; And take knowledge of the diuersities of the Sounds. I my selfe haue tryed, that a Bell of Gold yeeldeth an excellent Sound, not inferiour to that of *Siluer*, or *Brasse*; but rather better: yet we see that

a peece

peece of Money of Gold found, th farre more flat than a peece of Money of Silver.

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The Harpe hath the *Concave*, not along the *Strings*, but across the *Strings*; And no *Instrument* hath the *Sound* so Melting, and Prolonged, as the *Triss Harpe*. So as I suppose, that if a *Virginal* were made with a double *Concave*, the one all the length as the *Virginal* hath; the other at the End of the *Strings*, as the *Harpe* hath, It must needs make the *Sound* perfecter, and not so Shallow, and Iarring. You may trie it, without any *Sound-Board* along, but only *Harpe-wise*, at one end of the *Strings*: Or lastly with a double *Concave*, at Each end of the *Strings* one.

Experiments
in Consort,
touching the
Mixture of
Sound.

224

Here is an apparent Diuersity between the *Species Visible*, and *Audible*, in this; That the *Visible* doth not mingle in the *Medium*, but the *Audible* doth. For if we looke abroad, we see *Heaven*, a number of *Starres*, *Trees*, *Hills*, *Men*, *Beasts*, at once. And the *Species* of the one doth not confound the other. But if so many sounds came from several *Parts*, one of them would utterly confound the other. So wee see, that *Voices*, or *Consorts* of *Musicke* doe make an *Harmony* by *Mixture*, which *Colours* doe not. It is true neuerthelesse, that a great *Light* drowneth a smaller, that it cannot be seene; As the *Sunne* that of a *Gloworme*, as well as a Great *Sound* drowneth a lesser. And I suppose likewise that if there were two *Lanthornes* of *Glasse*, the one a *Crimsin*, and the other an *Azure*, and a *Candle* within either of them, those *Coloured Lights* would mingle, and cast vpon a *White Paper* a *Purple Colour*. And euen in *Colours*, they yeeld a faint and weake *Mixture*: For white walls make *Roomes* more lightsome than blacke, &c. But the Cause of the *Confusion* in *Sounds*, and the *Inconfusion* in *Species Visible*, is, For that the *Sight* worketh in *Right Lines*, and maketh several *Cones*; And so there can be no *Coincidence* in the *Eye*, or *Visuall Point*: But *Sounds*, that moue in *Oblique* and *Arcuate Lines*, must needs encounter, and disturbe the one the other.

225

The sweetest and best *Harmony* is, when every *Part*, or *Instrument*, is not heard by it selfe, but a *Conflation* of them all; Which requireth to stand some distance off. Euen as it is in the *Mixture* of *Perfumes*, Or the *Taking* of the *Smells* of several *Flowers* in the *Aire*.

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The *Disposition* of the *Aire*, in other *Qualities*, except it be ioyned with *Sound*, hath no great *Operation* vpon *Sounds*: For whether the *Aire* be lightsome or darke, hot or cold, quiet or stirring, (except it be with *Noise*) sweet-smelling, or stinking, or the like; it importeth not much: Some petty *Alteration* or difference it may make.

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But *Sounds* doe disturbe and alter the one the other: Sometimes the one drowning the other, and making it not heard; Sometimes the one Iarring and discording with the other, and making a *Confusion*; Sometimes the one Mingling and Compounding with the other, and making an *Harmony*.

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Two *Voices* of like loudnes, will not be heard, twice as far, as one

of

of them alone ; And two Candles oflike light, will not make Things seeme twice as farre off, as one. The Cause is profound ; But it seemeth that the Impressions, from the Objects of the Senses, do mingle respectively, euery one with his kinde ; But not in proportion, as is before demonstrated : And the reason may be, because the first Impression, which is from *Prinative* to *Active*, (As from *Silence* to *Noise*, or from *Darknesse* to *Light*), is a greater Degree, than from *Lesse Noise*, to *More Noise*, or from *Lesse light*, to *More light*. And the reason of that againe may be, For that the *Aire*, after it hath received a Charge, doth not receiue a Surcharge, or greater Charge, with like Appetite, as it doth the first Charge. As for the Encrease of Vertue, generally, what Proportion it beareth to the Encrease of the Matter, it is a large field, and to be handled by it selfe.

ALL Reflections Concurrent doe make Sounds Greater ; But if the Body that createth, either, the Originall Sound, or the Reflection, be cleane and smooth, it maketh them Sweeter. Tryall may be made of a *Lute* or *Violl*, with the Belly of polished Brasse, in stead of Wood. We see that euen in the open Aire, the *wire String* is sweeter, than the *String of Guts*. And we see that for Reflexion, water excelleth ; As in *Musicke* neare the water ; Or in *Eccho's*.

It hath been tryed, that a *Pipe* a little moistned on the inside, but yet so as there be no Drops left, maketh a more solemne Sound, than if the *Pipe* were drie : But yet with a sweet degree of *Sibillation* or *Purling*. As we touched it before in the title of *Equality*. The Cause is, for that all Things Porous, being superficially wet, and (as it were) betweene drie and wet, become a little more Euen and Smooth ; But the Purling, (which must needs proceed of Inequality,) I take to be bred betweene the Smoothnesse of the inward Surface of the *Pipe*, which is wet ; And the Rest of the Wood of the *Pipe*, vnto which the Wet commeth not, but it remaineth drie.

In *Frostie weather*, *Musicke* within doores foundeth better. Which may be, by reason, not of the Disposition of the *Aire*, but of the wood or *String* of the Instrument, which is made more Crispe, and so more porous and hollow : And wee see that *Old Lutes* sound better than *New*, for the same reason. And so doe *Lute-strings* that haue beene kept long.

Sound is likewise Meliorated by the Mingling of open Aire with *Pent Aire* ; Therefore Tryall may be made of a *Lute* or *Violl* with a double Belly ; Making another Belly with a Knot ouer the Strings ; yet so, as there be Roome enough for the Strings, and Roome enough to play below that Belly. Triall may be made also of an *Irish Harpe*, with a Concave on both Sides ; Whereas it useth to haue it but on one Side. The doubt may be, lest it should make too much Resounding ; whereby one Note would ouertake another.

If you sing into the Hole of a *Drumme*, it maketh the Singing more sweet.

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sweet. And so I conceive it would, if it were a *Song* in Parts, sung into severall *Drums*; And for handsomnesse and strangenesse sake, it would not be amisse to have a Curtaine bet weene the Place where the *Drums* are, and the *Hearers*.

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When a *Sound* is created in a *wind-Instrument*, betweene the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Bodie of the *Pipe*, it meliorateth the *Sound*. For (no doubt) there would be a differing *Sound* in a *Trumpet*, or *Pipe of Wood*; And againe in a *Trumpet* or *Pipe of Brasse*. It were good to trie *Recorders* and *Hunters Hornes* of *Brasse*, what the *Sound* would be.

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Sounds are meliorated by the *Intension*, of the *Sense*; where the *Common Sense* is collected most, to the *Particular Sense* of *Hearing*, and the *Sight* suspended: And therefore, *Sounds* are sweeter, (as well as greater,) in the *Night*, than in the *Day*; And I suppose, they are sweeter to blinde Men, than to Others: And it is manifest, that betweene *Sleeping* and *Waking*, (when all the *Senses* are bound and suspended) *Musicke* is farre sweeter, than when one is fully *waking*.

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It is a Thing strange in Nature, when it is attentively considered; How *Children* and some *Birds*, learne to imitate *Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that speaketh; For *Birds* are as well taught in the *Darke*, as by *Light*. The *Sounds* of *Speech* are very Curious and Exquisite: So one would thinke it were a Lesson hard to learne. It is true, that it is done with time, and by little and little, and with many *Essayes* and *Proffers*: But all this dischargeth not the Wonder. It would make a Man thinke (though this which we shall say may seeme exceeding strange) that there is some *Transmission* of *Spirits*; and that the *Spirits* of the *Teacher*, put in *Motion*, should worke with the *Spirits* of the *Learner*, a Pre-disposition to offer to *Imitate*; And so to perfect the *Imitation* by degrees. But touching *Operations* by *Transmissions* of *Spirits* (which is one of the highest Secrets in Nature,) we shall speake in due place, Chiefly when wee come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a predisposition to *Imitate*. Wee see how readie Apes and Monkees are, to imitate all *Motions* of Man: And in the Catching of *Dottrells*, we see, how the Foolish Bird playeth the Ape in *Gestures*: And no Man (in effect) doth accompany with others, but hee learneth, (ere he is aware,) some *Gesture*, or *Voice*, or *Fashion* of the other.

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In *Imitation* of *Sounds*, that Man should be the *Teacher*, is no Part of the Matter; For *Birds* will learne one of another; And there is no Reward, by feeding, or the like given them for the *Imitation*; And besides, you shall have *Parrots*, that will not only imitate *Voyces*, but *Laughing*, *Knocking*, *Squeaking* of a *Doore* vpon the *Hinges*, or of a *Cart-wheele*; And (in effect) any other *Noise* they heare.

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No *Beast* can imitate the *Speech* of Man, but *Birds* onely; For the Ape

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it selfe, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of Speech. It is true, that I haue knowne a Dog, that if one howled in his Eare, he would fall a howling a great while: What should be the Aptnesse of *Birds*, in comparison, of *Beasts*, to *imitate* the Speech of *Man*, may be further enquired. We see that *Beasts* haue those Parts, which they count the *Instruments* of Speech, (as *Lips*, *Teeth*, &c.) liker vnto *Man*, than *Birds*. As for the *Necke*, by which the *Throat* passeth, we see many *Beasts* haue it, for the Length, as much as *Birds*. What better *Gorge*, or *Attire*, *Birds* haue, may be further enquired. The *Birds* that are knowne to be *Speakers*, are *Parrots*, *Pyes*, *Iayes*, *Dawes*, and *Rauens*. Of which *Parrots* haue an adunque Bill, but the rest not.

But I conceiue, that the Aptnesse of *Birds*, is not so much in the Conformity of the *Organs* of Speech, as in their *Attention*. For Speech must come by *Hearing* and *Learning*; And *Birds* giue more heed, and marke *Sounds*, more than *Beasts*; because naturally they are more delighted with them, and practise them more; As appeareth in their *Singing*. We see also, that those that teach *Birds* to sing, doe keep them *Waking*, to increase their *Attention*. We see also that *Cocke-Birds* amongst *Singing-Birds*, are euer the better *Singers*; which may be, because they are more liuely, and listen more,

Labour, and *Intention* to *imitate* voices, doth conduce much to *Imitation*: And therefore we see, that there be certaine *Pantomimi*, that will represent the voices of *Players* of *Enterludes*, so to life, as if you see them not, you would thinke they were those *Players* themselues; And so the *Voices* of other *Men* that they heare.

There haue beene some, that could counterfeit the *Distance* of *Voices* (which is a *Secondary* *Object* of *Hearing*) in such sort; As when they stand fast by you, you would thinke the Speech came from as farre off, in a fearefull manner. How this is done, may be further enquired. But I see no great vse of it, but for *Imposture*, in counterfeiting *Ghosts* or *Spirits*.

There be three Kinds of *Reflexions* of *Sounds*; A *Reflexion* *Concurrent*; A *Reflexion* *Iterant*, which we call *Eccho*; And a *Super-reflexion*, or an *Eccho* of an *Eccho*; whereof the first hath beene handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now speake of.

The *Reflexion* of *Species* *Visible*, by *Mirroures*, you may command, Because passing in *Right Lines*, they may be guided to any *Point*: But the *Reflexion* of *Sounds* is hard to master; Because the *Sound* filling great *Spaces* in *Arched Lines*, cannot be so guided: And therefore we see there hath not beene practised, any *Meanes* to make *Artificiall* *Eccho's*. And no *Eccho* already knowne returneth in a very narrow *Roome*.

The *Naturall* *Eccho's* are made vpon *walls*, *woods*, *Rockes*, *Hills*, and *Bankes*, As for *waters*, being neere, they make a *Concurrent* *Eccho*; But being

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being further off (as vpon a large *Riuer*) they make an *Iterant Eccho*: For there is no difference betweene the *Concurrent Eccho*, and the *Iterant*, but the *Quicknesse*, or *Slownesse* of the *Returne*. But there is no doubt, but *water* doth help the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

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It is certaine (as hath beene formerly touched, that if you speake thorow a *Trunke*, stopped at the further end, you shall finde a *Blast* returne vpon your Mouth, but no *Sound* at all. The *Cause* is, for that the *Closenesse*, which preserueth the *Originall*, is not able to preserue the *Reflected Sound*: Besides that *Eccho's* are seldome created but by loud *Sounds*. And therefore there is lesse hope of *Artificiall Echoes* in *Aire*, pent in a narrow *Concaue*. Neuerthelesse it hath bin tried, that One leaning ouer a *well*, of 25. Fathome deep, and speaking, though but softly, (yet not so soft as a whisper) the *water* returned a good *Audible Eccho*. It would be tried whether Speaking in *Caues*, where there is no Issue, saue where you speake, will not yeeld *Eccho's*, as *Wells* doe.

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The *Eccho* commeth as the *Originall Sound* doth, in a Round Orbe of *Aire*: It were good to try the Creating of the *Eccho*, where the Body *Repercussing* maketh an *Angle*: As against the *Returne* of a *Wall*, &c. Also we see that in *Mirrours*, there is the like *Angle* of *Incidence*, from the *Obiect* to the *Glasse*, and from the *Glasse* to the *Eye*. And if you strike a *Ball* side-long, not full vpon the *Surface*, the *Rebound* will be as much the contrary way; Whether there be any such *Resiliencie* in *Eccho's*, (that is, whether a Man shall heare better, if he stand aside the Body *Repercussing*, than if he stand where he speaketh, or any where in a right *Line* betweene;) may be tried. Triall likewise would be made, by standing neerer the Place of *Repercussing*, than hee that speaketh; And againe by standing further off, than he that speaketh; And so Knowledge would be taken, whether *Eccho's*, as well as *Originall Sounds*, be not strongest neere hand.

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There be many Places, where you shall heare a Number of *Eccho's* one after another: And it is when there is variety of *Hills* or *woods*, some neerer, some further off: So that the *Returne* from the further, being last created, will be likewise last heard.

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As the *Voice* goeth round, as well towards the *Backe*, as towards the *Front* of him that speaketh; So likewise, doth the *Eccho*; For you haue many *Back-Eccho's*, to the Place where you stand.

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To make an *Eccho*, that will report, three, or foure, or fise Words, distinctly, it is requisite, that the Body *Repercussing*, be a good distance off: For if it be neere, and yet not so neere, as to make a *Concurrent Eccho*, it choppeth with you vpon the sudden. It is requisite likewise, that the *Aire* be not much pent. For *Aire*, at a great distance, pent, worketh the same effect with *Aire*, at large, in a small distance. And therefore in the Triall of Speaking in the *well*, though the *Well* was deepe, the *Voice* came backe, suddenly; And would beare the Report but of two Words.

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For *Eccho's* vpon *Eccho's*, there is a rare Instance thereof in a Place, which I will now exactly describe. It is somethree or foure Miles from *Paris*, neere a Towne called *Point-charenton*; And some Bird-bolt shot, or more, from the Riuer of *Seane*. The Roome is a *Chappell*, or small *Church*. The Walls all standing, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of *Isles* of *Churches*, also standing; The Roofe all open, not so much as any embowment neere any of the walls left. There was against euery Pillar, a Stacke of Billets, aboue a Mans Height; which the Watermen, that bring Wood downe the *Seane* in Stacks, and not in Boats, laid there (as it seemeth) for their ease. Speaking at the one End, I did heare it returne the Voice thirteene seuerall times; And I haue heard of others, that it would returne sixteene times: For I was there about three of the Clocke in the Afternoone: And it is best (as all other *Eccho's* are) in the Euening. It is manifest, that it is not *Eccho's* from seuerall places, but a *Tossing* of the *Voice*, as a Ball, to and fro; Like to *Reflexions* in *Looking-Glasses*; where if you place one *Glasse* before, and another behind, you shall see the *Glasse* behind with the *Image*, within the *Glasse* before; And againe, the *Glasse* before in that; and diuers such *Super-Reflexions*, till the *species speciei* at last die. For it is euery Returne weaker, and more shady. In like maner, the *Voice* in that *Cappell*, createth *speciem speciei*, and maketh succeeding *Super-Reflexions*; For it melteth by degrees, and euery *Reflexion* is weaker than the former: So that if you speake three Words, it will (perhaps) some three times report you the whole three Words; And then the two latter Words for some times; And then the last Word alone for sometimes; Still fading and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or fise Words; In this *Eccho* of so many Returnes, vpon the matter, you heare aboue twenty Words for three.

The like *Eccho* vpon *Eccho*, but onely with two Reports, hath beene obserued to be, if you stand betweene a *House*, and a *Hill*, and lure towards the *Hill*. For the *House* will giue a *Back-Eccho*; One taking it from the other, and the latter the weaker.

There are certaine *Letters*, that an *Eccho* will hardly expresse; As *S*. for one; Especially being Principall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Parisian*, that tooke it to the Worke of Spirits. And of good Spirits. For (said he) call *Satan*, and the *Eccho*, will not deliuer backe the *Deuils* name; But will say, *Vat'en*; Which is as much in *French*, as *Apage*, or *Anoid*. And thereby I did hap to finde, that an *Eccho* would not returne *S*, being but a Hissing and an *Interior Sound*.

Eccho's are some more sudden, and chop againe, as soone as the *Voice* is deliuered; As hath beene partly said: Others are more deliberate that is, giue more Space betweene the *Voice* and the *Eccho*, which is caused by the locall Neereneffe, or Distance; Some will report a longer Train of Words; And some a shorter: Some more loud (full as loud as the *Originall*,

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gimall, and sometimes more loud ;) And some weaker and fainter.

Where *Eccho's* come from severall Parts, at the same distance, they must needs make (as it were) a Quire of *Eccho's*, and so make the Report greater, and euen a *Continued Eccho*; which you shall finde in some *Hills*, that stand encompassed, Theater-like.

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It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I doe not thinke, that if a *Sound* should passe thorow diuers *Mediums*, (as *Aire*, *Cloth*, *wood*) it would deliuer the *Sound* in a differing Place, from that vnto which it is deferred; which is the Proper Effect of *Refraction*. But *Maioration*, which is also the Worke of *Refraction*, appeareth plainly in *Sounds* (as hath beene handled at full;) But it is not by Dinerfity of *Mediums*.

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Dissent between
Visibles and
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We haue *obiter*, for Demonstrations sake, vsed in diuers *Instances*, the *Examples* of the *Sight*, and *Things Visible*, to illustrate the *Nature* of *Sounds*. But we thinke good now to prosecute that *Comparison* more fully.

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Both of them *spread themselves in Round*, and fill a whole Floare or Orbe, vnto certaine Limits: and are carried a great way: And doe languish and lessen by degrees, according to the Distance of the Obiects from the Sensories.

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Both of them haue the whole *Species* in every small *Portion* of the *Aire*, or *Medium*; So as the *Species* doe passe thorow small *Crannies*, without Confusion: As we see ordinarily in *Lensels*, as to the *Eye*; And in *Crannies*, or *Chinks*, as to the *Sound*.

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Both of them are of a *sudden and easie Generation* and *Delation*; And likewise *perish swiftly*, and *suddenly*; As if you remoue the *Light*; Or touch the *Bodies* that giue the *Sound*.

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Both of them doe *receiue* and *carry exquisite* and *accurate Differences*; As of *Colours*, *Figures*, *Motions*, *Distances*, in *Visibles*; And of *Articulate Voices*, *Tones*, *Songs*, and *Quauering*s, in *Audibles*.

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Both of them in their *Vertue* and *Working*, doe not appeare to *emit any Corporall Substance* into their *Mediums*, or the Orbe of their *Vertue*; Neither againe to *raise* or *stir any euident locall Motion* in their *Mediums*, as they passe; but onely to carry certaine *Spiritual Species*; The perfect Knowledge of the Cause whereof, being hitherto scarcely attained, we shall search and handle in due place.

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Both of them seeme not to *Generate* or *produce* any other *Effect* in *Nature*,

ture, but such as appertaineth to their proper Obiects, and Senses, and are otherwise Barren.

But *Both* of them in their owne proper Action, doe worke three manifest *Effects*. The first, in that the *Stronger Species drowneth the Lesser*; As the Light of the Sunne, the Light of a Glow-worme, the Report of an Ordinance, the Voice: The Second, in that an *Object of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sunne the Eye, a violent Sound (neere the Eare) the Hearing: The Third, in that *both of them will be reuerberate*; As in *Mirrouers*; And in *Eccho's*.

Neither of them doth *destroy or hinder the Species of the other*, although they encounter in the same *Medium*; As Light or Colour hinder not Sound; Nor *è contrà*.

Both of them affect the sense in *Living Creatures*, and yeeld *Obiects of Pleasure and Dislike*: Yet neuerthelesse, the *Obiects* of them doe also (if it be well obserued) affect and worke vpon dead Things; Namely, such as haue some Conformity with the *Organs* of the two *Senses*; As *Visibles* worke vpon a *Looking-Glasse*, which is like the Pupill of the Eye; And *Audibles* vpon the Places of *Eccho*, which resemble in some sort, the Cauerne and structure of the Eare.

Both of them doe *dinersly worke*, as they haue their *Medium* *dinersly disposed*. So a Trembling *Medium* (as Smoake) maketh the Obiect seeme to tremble; and a Rising or Falling *Medium* (as Winds) maketh the Sounds to rise, or fall.

To *Both*, the *Medium*, which is the most Propitious and Conducibile, is *Aire*; For Glasse or Water, &c. are not comparable.

In *Both* of them, where the *Object is Fine and Accurate*, it conduceth much to haue the *Sense Intensive, and Erect*; In so much as you contract your *Eye*, when you would see sharply; And erect your *Eare*, when you would heare attentiuely; which in Beasts that haue Eares moueable, is most manifest.

The *Beames of Lights*, when they are multiplied and conglomerate, generate *Heat*; which is a different Action, from the Action of *Sight*: And the *Multiplication and Conglomeration* of Sounds doth generate an extreme *Rarefaction* of the *Aire*; which is an Action materiate, differing from the Action of *Sound*; If it bee true (which is anciently reported) that *Birds*, with great shouts, haue fallen downe.

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DISSENTS OF VISIBLES, and Audibles.

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THE *Species* of *Visibles* seeme to bee *Emissions* of *Beames* from the *Object* seene; Almost like *Odours*; saue that they are more *Incorporeall*: But the *Species* of *Audibles* seeme to Participate more with *Locall Motion*, like *Percussions* or *Impressions* made vpon the *Aire*. So that whereas all *Bodies* doe seeme to worke in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

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The *Species* of *Audibles* seeme to be carried more manifestly thorow the *Aire*, than the *Species* of *Visibles*: For (I conceiue) that a contrary strong *Wind* will not much hinder the *Sight* of *Visibles*, as it will doe the *Hearing* of *Sounds*.

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There is one *Difference*, aboue all others, betweene *Visibles* and *Audibles*, that is the most remarkable; As that whereupon many smaller *Differences* doe depend: Namely, that *Visibles*, (except *Lights*,) are carried in *Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the *Solidity* of *Bodies* doth not much hinder the *Sight*, so that the *Bodies* bee cleare, and the *Pores* in a *Right Line*, as in *Glasfe*, *Crytall*, *Diamonds*, *Water*, &c. But a thin *Scarfe*, or *Handkerchiefe*; though they bee *Bodies* nothing so *Solid*, hinder the *Sight*: Whereas (contrariwise) these *Porous Bodies* doe not much hinder the *Hearing*, but *Solid Bodies* doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small *Glasses* suffice; but to the *Reuerberation* of *Audibles*, are required greater *Spaces*, as hath likewise beene said before.

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Visibles are seene further off, than *Sounds* are heard; Allowing neuertheless the *Rate* of their *Bignesse*: For otherwise a *great Sound* will bee heard further off, than a *Small Body* seene.

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Visibles require (generally) some *Distance* betweene the *Object*, and the *Eye*, to bee better seene; Whereas in *Audibles*, the nearer the *Approach* of the *Sound* is to the *Sense*, the better. But in this there may bee a double *Errour*. The one, because to *Seeing*, there is required *Light*; And any thing that toucheth the *Pupill* of the *Eye* (all ouer) excludeth the *Light*. For I haue heard of a *Person* very credible (who himselfe was

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cured of a Cataract in one of his Eyes) that while the Silver Needle did worke vpon the Sight of his Eye, to remoue the Filme of the Cataract, he neuer saw any thing more cleare or perfect, than that white Needle: Which (nodoubt) was, because the Needle was lesse than the *Pupill* of the Eye, and so tooke not the Light from it. The other Error may be, for that the *Object* of Sight doth strike vpon the *Pupill* of the Eye, directly without any interception; whereas the *Cane* of the Eare doth hold off the *sound* a little from the Organ: And so neuertheless there is some *Distance* required in both.

Visibles are swiftilier carried to the *sense*, than *Audibles*. As appeareth in Thunder and Lightning; Flame and the Report of a Peece; Motion of the Aire in Hewing of Wood. All which haue beene set downe heretofore, but are proper for this Title.

I conceive also, that the *Species* of *Audibles* doe hang longer in the Aire, than those of *Visibles*: For although euenthose of *Visibles*, doe hang some time, as we see in Rings turned, that shew like Spheres; In *Lure-strings* fillipped; A *Fire-Brand* carried along, which leaueth a Train of Light behind it; And in the *Twilight*; And the like: Yet I conceive that *Sounds* stay longer, because they are carried vp and downe with the Wind: And because of the Distance of the Time in *Ordinance discharged*, and heard 20. Miles off.

In *Visibles*, there are not found *Objects* so Odious and Ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate *Objects*. And therefore in *Pictures*, those foule *Sights* doe not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpened, doth offend so much, as it setteth the Teeth on Edge. And any of the *harsh Discords* in *Musicke*, the Eare doth straight-waies refuse.

In *Visibles*, after great Light, if you come suddenly into the *Darke*; Or contrariwise, out of the *Darke* into a *Glaring Light*, the Eye is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after a *deepe Silence*, may be better enquired. It is an old Tradition, that those that dwell neere the *Cataracts* of *Nilus*, are stricken deafe: But wee finde no such Effect, in *Cannoniers*, nor *Millers*, nor those that dwell vpon Bridges.

It seemeth that the *Impression* of *Colours* is so weake, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; whereof the Basis is in the *Object*, and the Verticall Point in the Eye: So as there is a Corradiation and Coniunction of *Beames*; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, whereof we speake not. For the *Beames* passe, and giue little Tincture to that Aire, which is Adiacent; which if they did; wee should see *Colours* out of a Right line. But as this is in *Colours*, so otherwise it is in the *Body* of *Light*. For when there is a Skreene betweene the Candle and the Eye, yet the *Light* passeth to the Paper whereon One writeth; So that the *Light* is seene, where the *Body* of the *Flame* is not

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scene; And where any *Colours* (if it were placed where the Body of the *Flame* is) would not be scene. I iudge that *Sound* is of this Latter Nature: For when two are placed on both sides of a Wall, and the Voice is heard, I iudge it is not onely the *Originall Sound*, which passeth in an *Arched Line*; But the *Sound*, which passeth about the Wall in a Right Line, begetteth the like Motion round about it, as the first did, though more weake.

ALL *Concords* and *Discords* of *Musicke*, are, (no doubt) *Sympathies*, and *Antipathies* of *Sounds*. And so (likewise) in that *Musicke*, which wee call *Broken Musicke*, or *Consort Musicke*; Some *Consorts* of *Instruments* are sweeter than others; (A Thing not sufficiently yet observed:) As the *Irish Harpe*, and *Base Viall* agree well: The *Recorder* and *Stringed Musicke* agree well: *Organs* and the *Voice* agree well; &c. But the *Virginalls* and the *Lute*; Or the *Welsh-Harpe*, and *Irish Harpe*; Or the *Voice* and *Pipes* alone, agree not so well; But for the *Melioration* of *Musicke*, there is yet much left (in this Point of *Exquisite Consorts*) to try and enquire.

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There is a Common Observation, that if a *Lute*, or *Viall*, be layed vpon the Backe, with a small *Straw* vpon one of the *Strings*; And another *Lute* or *Viall* be laid by it; And in the other *Lute* or *Viall*, the *Unison* to that *String* be stricken; it will make the *String* moue; Which will appeare both to the Eye, and by the *Strawes* falling off. The like will be, if the *Diapason* or *Eight* to that *String* be stricken, either in the same *Lute* or *Viall*, or in others lying by; But in none of these there is any Report of *Sound*, that can be discerned, but onely Motion.

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It was deuised, that a *Viall* should haue a Lay of Wire Strings below, as close to the Belly, as a *Lute*; And then the *Strings* of Guts mounted vpon a Bridge, as in Ordinary *Vialls*; To the end, that by this meanes, the vpper *Strings* stricken, should make the lower resound by *Sympathy*, and so make the *Musicke* the better; Which, if it be to purpose, then *Sympathy* worketh, as well by Report of *Sound*, as by *Motion*. But this deuice I conceiue to be of no vse; because the vpper *Strings*, which are stopped in great variety, cannot maintaine a *Diapason* or *Unison*, with the Lower, which are neuer stopped. But if it should be of vse at all, it must be in *Instruments* which haue no Stops; as *Virginalls*, and *Harps*; wherein triall may be made of two Rowes of Strings, distant the one from the other.

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The Experiment of *Sympathy* may be transferred (perhaps) from *Instruments* of *Strings*, to other *Instruments* of *Sound*. As to try if there were in one Steeple, two Bells of *Unison*, whether the striking of the one would moue the other, more than if it were another Accord: And so in *Pipes* (if they be of equall Bore, and *Sound*) whether a little *Straw* or *Feather* would moue in the one *Pipe*, when the other is blowne at an *Unison*.

It

It seemeth, both in *Eare*, and *Eye*, the *Instrument* of *Sense* hath a *Sympathy* or *Similitude* with that which giveth the *Reflection*; (As hath beene touched before.) For as the *Sight* of the *Eye* is Like a *Crytall*, or *Glasse*, or *Water*; So is the *Eare* a *tinuous Caue*, with a hard *Bone*, to stop and reuerberate the *Sound*: Which is like to the *Places* that report *Eccho's*.

When a Man *Awaketh*, he cannot *Heare* so well. The *Cause* is, for that the *Membrane* of the *Eare* is extended; And so rather casteth off the *Sound*, than draweth it to.

We *Heare* better when we hold our *Breath*, than contrary; In so much as in all *Listening* to attaine a *Sound* a farre off, Men hold their *Breath*. The *Cause* is, For that in all *Expiration*, the *Motion* is *Outwards*; And therefore, rather driueth away the *voice*, than draweth it: And besides wee see, that in all *Labour* to doe things with any strength, we hold the *Breath*: And *listening* after any *Sound*, that is heard with difficulty, is a kinde of *Labour*.

Let it be tried, for the *Helpe* of the *Hearing*, (and I conceive it likely to succeed,) to make an *Instrument* like a *Tunnell*; The narrow Part whereof may be of the *Bignesse* of the *Hole* of the *Eare*; And the *Broader End* much larger, like a *Bell* at the *Skirts*; And the length halfe a foot, or more. And let the narrow end of it be set close to the *Eare*: And marke whether any *Sound*, abroad in the open *Aire*, will not be heard distinctly, from further distance, than without that *Instrument*; being (as it were) an *Eare-Spectacle*. And I have heard there is in *Spaine*, an *Instrument* in vse to be set to the *Eare*, that helpeth somewhat those that are *Thicke* of *Hearing*.

If the *Mouth* be shut close, neuerthelesse there is yeelded by the *Roofe* of the *Mouth*, a *Murmur*. Such as is vsed by dumbe Men: But if the *Nostrils* be likewise stopped, no such *Murmure* can be made; Except it be in the *Bottom* of the *Pallate* towards the *Throat*. Whereby it appeareth manifestly, that a *Sound* in the *Mouth*, except such as afore said, if the *Mouth* be stopped, passeth from the *Pallat*, thorow the *Nostrils*.

The *Repercussion* of *Sounds*, (which wee call *Eccho*;) is a great Argument of the *Spiritual* Essence of *Sounds*. For if it were *Corporeall*, the *Repercussion* should be created in the same manner, and by like *Instruments*, with the *Original* *Sound*: But we see what a Number of *Exquisite Instruments* must concur in *Speaking* of *Words*, whereof there is no such Matter in the *Returning* of them; But only a plaine *Stop*, and *Repercussion*.

The *Exquisite Differences* of *Articulate Sounds*, carried along in the *Aire*, shew that they cannot be *Signatures* or *Impressions* in the *Aire*, as hath beene well refuted by the *Ancients*. For it is true, that *Seales* make excellent *Impressions*: And so it may bee thought of *Sounds* in their

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Experiments
in Consort,
touching the
Hindering or
Helping of the
Hearing.

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Experiments
in Consort,
touching the
Spiritual and
Fine Nature of
Sounds.

287

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their first Generation : But then the *Delation* and *Continuance* of them without any new Sealing, shew apparantly they cannot be Impressions.

289

All *sounds* are suddenly made, and doe suddenly perish ; But neither that, nor the *Exquisite Differences* of them, is Matter of so great Admiration : For the Quauerings, and Warblings in Lutes, and Pipes, are as swift ; And the Tongue, (which is no very fine Instrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are vttered. But that *sounds* should not only be so speedily generated, but carried so farre euery way, in such a momentanie time, deserueth more Admiration. As for Example ; If a Man stand in the middle of a Field and speake aloud, he shall be heard a Furlong in round ; And that shall be in *Articulate Sounds*, And those shall be Entire in euery little Portion of the Aire ; And this shall be done in the Space of lesse than a Minute.

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The *Sudden Generation* and *Perishing* of *sounds*, must be one of these two Wayes. Either that the *Aire* suffereth some Force by *Sound* ; and then restoreth it selfe, As Water doth ; Which being diuided, maketh many Circles, till it restore it selfe to the naturall Consistence : Or otherwise, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintaine it ; For that the *Aire* hath (as it should seeme) a secret and hidden Appetite of Receiuing the *Sound* at the first ; But then other Grosse and more Materiate Qualities of the *Aire* straightwayes suffocate it ; Like vnto *Flame*, which is generated with Alacritie, but straight quenched by the Enmitie of the *Aire*, or other Ambient Bodies.

There be these *Differences* (in generall) by which *Sounds* are diuided ; 1. *Muscall*, *Immuscall* ; 2. *Treble*, *Base* ; 3. *Flat*, *Sharpe* ; 4. *Soft*, *Loud* ; 5. *Exteriour*, *Interiour* ; 6. *Cleane*, *Harsh* or *Purling* ; 7. *Articulate*, *Inarticulate*.

We haue laboured (as may appeare,) in this *Inquisition* of *Sounds*, diligently ; Both because *Sound* is one of the most Hidden Portions of *Nature*, (as we said in the beginning :) And because it is a *Vertue* which may be called *Incorporeall*, and *Immateriate* ; wherof there be in *Nature* but few. Besides, we were willing, (now in these our first *Centuries*,) to make a Patterne or President of an *Exact Inquisition* ; And we shall doe the like hereafter in some other Subiects which require it. For wee desire that Men should learne and perceiue, how seuer a Thing the true *Inquisition* of *Nature* is ; And should ac-

custome

custome themselves, by the light of Particulars to enlarge their Mindes, to the Amplitude of the world; And not reduce the World to the Narrowness of their Mindes.

Metalls giue Orient and Fine Colours in Dissolutions; As Gold giueth an excellent Yellow; Quicke-Siluer an excellent Green; Tin giueth an excellent Azure: Likewise in their Putrefactions, or Rusts; As Vermilion, Verdegrease, Bise, Cirrus, &c. And likewise in their Vitrifications. The Cause is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Posture, and againe to retaine Part of their principall Spirit; Which two Things, (Equall Posture, and Quicke Spirits) are required chiefly, to make Colours lightsome.

Experiment
Solitary touching the Ori-
ent Colours in
dissolution of
Metalls.

291

IT conduceth vnto Long Life, and to the more Placide motion of the Spirits, which thereby doe lesse prey and consume the Iuyce of the Body; Either that *Mens Actions* be free and voluntary; That nothing be done *Inuitâ Minerâ*, but *Secundum Genium*: Or on the other side, that the *Actions* of Men be full of Regulation, and Commands within themselves: For then the Victory and Performing of the Command giueth a good Disposition to the Spirits, Especially if there be a Proceeding from Degree to Degree; For then the Sense of Victory is the greater. An example of the former of these, is in a Country life; And of the latter, in Monkes and Philosophers, and such as doe continually enioyne themselves.

Experiment
Solitary touching Pro-
longation of Life.

292

IT is certaine, that in all Bodies, there is an Appetite of Vnion, and Euitation of Solution of Continuity: And of this Appetite there be many Degrees; But the most Remarkable, and fit to be distinguished, are three. The first in Liquors; The second in Hard Bodies: And the third in Bodies Cleauing or Tenacious. In Liquors, this Appetite is weak: Wee see in Liquors, the Thredding of them in Stillicides, (as hath beene said;) The Falling of them in Round Drops, (which is the forme of Vnion;) And the Staying of them, for a little time, in Bubbles and Froth. In the second Degree or Kinde, this Appetite is strong; As in Iron, in Stone, in wood, &c. In the third, this Appetite is in a Medium betweene the other two: For such Bodies doe partly follow the Touch of another Bodie; And partly sticke and continue to themselves, And therefore they roape, and draw themselves in Threds; As we see in Pitch, Glem, Bird-lime, &c. But note, that all Solide Bodies are Cleauing, more or lesse: And that they loue better the Touch of somewhat that is Tangible, than of Aire. For water, in small quantity, cleaueth to any Thing that is Solid; And so would Metall too, if the weight drew it not off. And therefore Gold Foliate, or any Metall Foliate, cleaueth: But those Bodies which are noted to be Clammie, and Cleauing, are such, as haue a more indifferent Appetite (at once,) to follow another Bodie; And to hold to them-

Experiment
Solitary touching Appetite
of Vnion in Bo-
dies.

293

themselves. And therefore they are commonly *Bodies* ill mixed; And which take more pleasure in a *Forraine Body*, than in preferring their owne *Consistence*; And which haue little predominance in *Drought*, or *Moisture*.

Experiment
Solitary touch-
ing the like
Operations of
Heat, and Time.

294

Time, and Heat, are Fellowes in many Effects. Heat drieth *Bodies*, that doe easily expire, As *Parchment*, *Leaues*, *Roors*, *Clay*, &c. And, so doth *Time* or *Age* arefie, As in the same *Bodies*, &c. Heat dissolueth and melteth *Bodies*, that keepe in their *Spirits*; As in diuers *Liquefactions*; And so doth *Time*, in some *Bodies* of a softer *Consistence*: As is manifest in *Honey*, which by *Age* waxeth more liquid; And the like in *Sugar*; and so in old *Oyle*, which is euer more cleare, and more hot in *Medicinable* vse. Heat causeth the *Spirits* to search some *Issue* out of the *Body*; As in the *Volatility* of *Metalls*; And so doth *Time*; As in the *Rust* of *Metalls*. But generally *Heat* doth that in small time, which *Age* doth in long.

Experiment
Solitary touch-
ing the differ-
ring Operations
of Fire, and
Time.

295

Some things which passe the *Fire* are softest at first, and by *Time* grow hard; As the *Crumme* of *Bread*. Some are harder when they come from the *Fire*, and afterwards giue againe, and grow soft, as the *Crust* of *Bread*, *Bisket*, *Sweet Meats*, *Salt*, &c. The Cause is, for that in those things which wax Hard with *Time*, the *Worke* of the *Fire* is a Kinde of *Melting*: And in those that wax Soft with *Time*, (contrariwise,) the worke of the *Fire* is a Kinde of *Baking*; And whatsoeuer the *Fire* baketh, *Time* doth in some degree dissolue.

Experiment
Solitary touch-
ing Motions
by Imitation.

296

Motions passe from one *Man* to another, not so much by *Exciting* *Imagination*; as by *Inuitation*; Especially if there be an *Aptnesse* or *Inclination* before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe passe from *Man* to *Man*; For that that causeth *Gaping* and *Stretching* is, when the *Spirits* are a little *Heauy*, by any *Vapour*, or the like. For then they strue, (as it were,) to wring out, and expell that which loadeth them. So *Men* drowzie, and desirous to sleepe; Or before the *Fit* of an *Ague*; doe vse to *Yawne* and *Stretch*; And doe likewise yeeld a *Voice* or *Sound*, which is an *Interiection* of *Expulsion*: So that if another be apt and prepared to doe the like, he followeth by the *Sight* of another. So the *Laughing* of another maketh to *Laugh*.

Experiment
Solitary touch-
ing Infectious
Diseases.

297

There be some knowne *Diseases* that are *infectious*; And Others that are not. Those that are *infectious*, are; First, such as are chiefly in the *Spirits*; and not so much in the *Humours*; And therefore passe easily from *Body* to *Body*: Such are *Pestilences*, *Lippitudes*, and such like. Secondly, such as taint the *Breath*; Which wee see passeth manifestly from *Man* to *Man*; And not inuisibly, as the *Affects* of the *Spirits* doe: Such are *Consumptions* of the *Lungs*, &c. Thirdly, such as come forth to the *Skinne*; And therefore taint the *Aire*, or the *Body*

Adjacent;

Adiacent; Especially if they consist in an Vnctuous Substance, not apt to dissipate; Such are *Scabs*, and *Leprousie*. Forthly, such as are meere-ly in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they neuer infect, but by *Touch* only; And such a *Touch* also as commeth within the *Epidermis*; As the Venome of the *French Pox*; And the *Biting* of a *Mad Dog*.

Most *Powders* grow more Close and Coherent by *Mixture* of *water*, than by *Mixture* of *Oyle*, though *Oyle* be the thicker Body; As *Meale*; &c. The Reason is the Congruity of Bodies; which if it be more, maketh a perfecter Imbibition, and Incorporation; Which in most *Powders* is more beweeene *Them* and *water*, than beweeene *them* and *Oyle*: But *Painters Colours* ground, and *Asbes*, doe better incorporate with *Oyle*.

Experiment
Solitary tou-
ching the In-
corporation of
Powders and
Liquors.

298

Much *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for Others. If the Body be Hot, and Void of Superfluous Moistures, too much *Motion* hurteth: And it is an Errour in *Physitians*, to call too much vpon *Exercise*. Likewise Men ought to beware, that they vse not *Exercise*, and a *Spare Diet* both: But if much *Exercise*, then a *Plentifull Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the Parts more forcibly. Secondly, that helpeth to Excerne by *Sweat*, and so maketh the Parts assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be Consumed and Depredated by the *Spirits*. The *Evills* that come of *Exercise*, are: First, that it maketh the *Spirits* more Hot and Predatory. Secondly, that it doth absorbe likewise, and attenuate too much the Moisture of the *Body*. Thirdly, that it maketh too great *Con- cussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in Rest. But generally *Exercise*, if it be much, is no Friend to *Pro- longation of Life*; Which is one cause, why *women* liue longer than *Men*, because they stirre lesse.

Experiment
Solitary tou-
ching *Exercise*
of the *Body*.

299

Some *Food* we may vse long, and much without *Glutting*; As Bread, *Flesh* that is not fat, or ranke, &c. Some other, (though pleasant,) *Glutteth* sooner; As Sweet Meats, Fat Meats, &c. The Cause is, for that *Appetite* consisteth in the Emptinesse of the Mouth of the *Sto- macke*; Or possessing it with somewhat that is Astringent; And there- for Cold and Drie. But things that are Sweet and Fat, are more Fil- ling; And doe swimme and hang more about the Mouth of the *Sto- macke*; And goe not downe so speedily: And againe turne sooner to *Choler*, which is hot, and euer abateth the Appetite. Wee see also, that another Cause of *Satiety*, is an *Over-custome*; and of *Appetite* is *No- ueltie*: And therefore Meats, if the same be continually taken, induce *Loathing*. To giue the Reason of the *Distaste* of *Satiety*, and of the Plea-
sure

Experiment
Solitary tou-
ching Meats,
that induce Sa-
ciety.

300

sure in *Noueltie*; and to distinguish not onely in Meats and Drinkes, but also in Motions, Loues, Company, Delights, Studies, what they be that *Custome* maketh more gratefull; And what more tedious, were a large Field. But for *Meats*, the Cause is *Attraction*, which is quicker, and more excited toward that which is new, than towards that where of there remaineth a Rellish by former vse. And (generally) it is a Rule, that whatsoeuer is somewhat Ingrate at first, is made Gratefull by *Custom*; But whatsoeuer is too Pleasing at first groweth quickly to *satiety*.

NATV.



NATVRALL HISTORIE.

IV. Century.



ACCELERATION of *Time* in *Works* of *Nature*, may well be esteemed *Inter Magnalia Nature*. And euen in *Diuine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. We will now therefore proceed to the Enquiry of it : And for *Acceleration* of *Germination*, wee will referre it ouer, vnto the place, where wee shall handle the Subiect of *Plants*, generally ; And will now begin with other *Accelerations*.

Liquors are (manv of them) at the first, thicke and troubled : As *Must*, *Wort*, *Iuyces* of *Fruits*, or *Herbs* expressed, &c. And by *Time* they settle and Clarifie. But to make them cleare before the *Time*, is a great Worke ; For it is a *Spurre* to *Nature*, and putteth her out of her pace : And besides, it is of good vse, for making *Drinkes*, and *Sauces*, Potable, and Seruiceable, speedily ; But to know the *Meanes* of *Accelerating Clarification*, we must first know the *Causes* of *Clarification*. The first *Cause* is, by the *Separation* of the *Grosser Parts* of the *Liquor*, from the *Finer*. The second, by the *Equall Distribution* of the *Spirits* of the *Liquor*, with the *Tangible Parts* : For that euer representeth Bodies Cleare and Vntroubled,

Experiments
in Confort
touching the
Clarification of
Liquors, and
the Accelerating
thereof.

bled. The third, by the *Refining* the *Spirits* it selfe, which thereby giueth to the *Liquor* more Splendor, and more Lultre.

302 First, for *Separation*; It is wrought by *weight*; As in the ordinary Residence or Settlement of *Liquors*: By *Heat*: By *Motion*. By *Precipitation*, or *Sublimation*; (That is, a calling of the seuerall Parts, either vp, or downe, which is a kinde of *Attraction*:) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquor*; which Viscous Body (afterwards seuered) draweth with it the grosser parts of the *Liquor*: And Lastly, By *Percolation* or *Passage*.

303 Secondly, for the *Even Distribution* of the *Spirits*; It is wrought by *Gentle Heat*; And by *Agitation* or *Motion*; (For of *Time* wee speake not, because it is that, we would anticipate and represent:) And it is wrought also, by *Mixture* of some other *Body*, which hath a vertue to open the *Liquor*, and to make the *Spirits* the better passe thorow.

304 Thirdly, for the *Refining* of the *Spirit*, it is wrought likewise by *Heat*; By *Motion*; And by *Mixture* of some *Body* which hath *Vertue* to attenuate. So therefore (hauing shewne the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take these *Instances*, and *Trialls*.

305 It is in common Practice, to draw *wine*, or *Beere*, from the *Lees*, (which we call *Racking*;) whereby it will *Clarifie* much the sooner: For the *Lees*, though they keepe the *Drinke* in Heart, and make it lasting; yet withall they cast vp some Spissitude: And this *Instance* is to bee referred to *Separation*.

306 On the other side, it were good to try, what the Adding to the *Liquor* more *Lees* than his owne will worke; For though the *Lees* doe make the *Liquor* turbide; yet they refine the *Spirits*. Take therefore a Vessell of *New Beere*; And take another Vessell of *New Beere*, and Racke the one Vessell from the *Lees*, and powre the *Lees* of the Racked Vessell into the vnacked Vessell, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirits*.

307 Take *New Beere*, and put in some Quantity of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Grosser Parts, whereby they may fall downe into *Lees*. And this *Instance* againe is referred to *Separation*.

308 The longer *Malt*, or *Herbs*, or the like, are infused in *Liquor*, the more thicke and troubled the *Liquor* is; But the longer they bee decocted in the *Liquor*, the clearer it is. The Reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the Grosse Body, that goeth into the *Liquor*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or sealeth at the Bottome. And therefore the most Exact Way to *Clarifie* is; First, to *Infuse*, and then to take off the *Liquor* and *Decoct* it; as they doe in *Beere*, which hath *Malt* first Infused in the *Liquor*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

309 Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almost

almost to the very Necke : Let the Bottle be well stopped, lest it flie out : And continue it, renewing the *Embers* every day, by the space of Ten Dayes; And then compare it with another Bottle of the same *Beere* set by. Take also Lime both *Quenched* and *Vnquenched*, and set the Bottles in them, *ut supra*. This *Instance* is referred, both to the *Even Distribution*, and also to the *Refining* of the *Spirits* by *Heat*.

Take *Bottles*, and *Swing* them; Or *Carry* them in a *Wheele-Barrow*, vpon *Rough Ground*; twice in a day : But then you may not fill the *Bottles* full, but leaue some *Aire*; For if the *Liquor* come close to the *Stopples*, it cannot play, nor flower : And when you haue shaken them well, either way, powre the *Drink* into another Bottle, stopped close, after the vsuall manner; For if it stay with much *Aire* in it, the *Drinke* will pall; neither will it settle so perfectly in all the Parts. Let it stand some 24. houres: Then take it, and put it againe into a *Bottle* with *Aire*, *ut supra*: And thence into a *Bottle* stopped, *ut supra*: And so repeat the same *Operation* for seuen dayes. Note that in the Emptying of one Bottle into another, you must doe it swiftly, lest the *Drinke* pall. It were good also, to try it in a *Bottle* with a little *Aire* below the Necke, without Emptying. This *Instance* is referred to the *Even distribution* and *Refining* of the *Spirits* by *Motion*.

As for *Percolation*, *Inward* and *Outward*, (which belongeth to *Separation*.) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New Beere*, and stirred with it : For it may bee that the *Grosser Part* of the *Beere* will cleaue to the *Milke*: The Doubt is, whether the *Milke* will seuer well againe; Which is soone tried. And it is vsuall in *Clarifying Ippocrasse* to put in *Milke*, Which after seuereth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath beene said elsewhere. Also for the better *Clarification* by *Percolation*, when they tun *New Beere*, they vse to let it passe thorow a *Strainer*; And it is like, the finer the *Strainer* is, the cleerer it will be.

The *Accelerating* of *Maturation* wee will now enquire of. And of *Maturation* it selfe. It is of three Natures. The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impostumes* and *Vlcers*. This last wee referre to another Place, where wee shall handle *Experiments Medicinall*. There bee also other *Maturations*, as of *Metalls*, &c. whereof wee will Ipeake as Occasion serueth. But wee will begin with that of *Drinkes*, because it hath such Affinity with the *Clarification* of *Liquors*.

For the *Maturation* of *Drinkes*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digest more perfectly the *Grosser Parts*: And it is effected partly, by the same meanes, that *Clarification* is (whereof wee spake before;) But then note, that an *Extreme Clarification* doth

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Experiments
in Consort
touching *Ma-
turation*, and
the *Accelerating*
thereof. And
first touching
the *Maturation*
and *Quickning*
of *Drinks*. And
next touching
the *Maturation*
of *Fruits*.

312

spread the *Spirits* so Smooth, as they become Dull, and the *Drinke* dead, which ought to haue a little Flouring. And therefore all your Cleare *Amber Drinke* is flat.

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We see the *Degrees of Maturation of Drinckes*; In *Must*; In *wine*, as it is drunke; And in *Vinegar*. Whereof *Must* hath not the *Spirits* well Congregated; *Wine* hath them well vnited; so as they make the Parts somewhat more Oily: *Vinegar* hath them Congregated, but more Ieiune, and in smaller Quantity; The greatest and finest Spirit and Part being exhaled; For we see *Vinegar* is made by setting the Vessell of *wine* against the hot Sun: And therefore *Vinegar* will not burne; For that much of the Finer Parts is Exhaled.

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The *Refreshing and Quickning of Drinke* Palled, or Dead, is by *Enforcing the Motion of the Spirit*: So we see that *Open weather* relaxeth the *Spirit*, and maketh it more lively in *Motion*. Wee see also *Bottling* of *Beere*, or *Ale*, while it is New, and full of *Spirits* (so that it spirteth when the Stopple is taken forth) maketh the *Drinke* more quicke and windy. A *Pan of Coales* in the *Cellar* doth likewise good, and maketh the *Drinke* worke againe. *New Drinke*, put to *Drinke* that is *Dead*, prouoketh it to worke againe: Nay, which is more (as some affirme) *A Brewing of New Beere*, set by *Old Beere*, maketh it worke againe. It were good also to *Enforce the Spirits* by some *Mixtures*, that may excite and quicken them; As by putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. Wee see *Creame* is *Matured*, and made to rise more speedily, by Putting in *Cold Water*, which, as it seemeth, getteth downe the *Whey*.

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It is tried, that the *Burying of Bottles of Drinke* well stopped, either in *dry Earth*, a good depth; Or in the *Bottom of a well within water*; And best of all the *Hanging of them in a deepe Well* somewhat *aboue the water*, for some fortnights space, is an Excellent *Meanes* of making *Drinke* fresh, and quicke: for the *Cold* doth not cause any *Exhaling of the Spirits* at all; As *Heat* doth, though it rarifieth the rest that remaine: But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they Incorporate the Parts of the *Liquor* perfectly.

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As for the *Maturation of Fruits*, It is wrought by the *Calling forth of the Spirits of the Body Ourward*, and so *Spreading them more smoothly*: And likewise by *Digesting*, in some degree, the *Grosser Parts*; And this is Effected, by *Heat*; *Motion*; *Attraction*; And by a *Rudiment of Putrefaction*: For the *Inception of Putrefaction* hath in it a *Maturation*.

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There were taken *Apples*, and laid in *straw*; In *Hay*; In *Flower*; In *Chalke*; In *Lime*; Couered ouer with *Onions*; Couered ouer with *Crabs*; Closed vp in *Wax*; Shut in a *Box*, &c. There was also an *Apple* hanged vp in *Smoake*: Of all which the *Experiments* sorted in this Manner.

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After a *Moneths Space*, the *Apple* Enclosed in *wax*, was as *Greene* and *Fresh* as at the first putting in, and the *Kernels* continued *White*. The *Cause* is, for that all *Exclusion of Open Aire* (which is euer *Predatory*) maintaineth the *Body* in his first *freshnesse*, and *Moisture*: But the *Inconuenience*

convenience is, that it tasteth a little of the *wax* : Which I suppose, in a *Pomgranate*, or some such thicke-coated *Fruit*, it would not doe.

The *Apple* Hanged in the *Smoake*, turned like an Old Mellow *Apple*, Wrinkled, Dry, Soft, Sweet, Yellow within. The *Cause* is, for that such a degree of *Heat*, which doth neither Melt, nor Scorch, (For wee see that in a great *Heat*, a *Roast Apple*, Softneth and Melteth ; And *Pigs feet*, made of *Quarters of Wardens*, scorch and haue a Skin of Cole) doth Mellow, and not Adure : The *Smoake* also maketh the *Apple* (as it were) sprinkled with *Soots*, which helpeth to *Mature*. We see that in *Drying of Peares*, and *Prunes*, in the Oven, and Remouing of them often as they begin to Sweat, there is a like Operation ; But that is with a farre more Intense degree of *Heat*.

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The *Apples* couered in the *Lime* and *Ashes*, were well *Matured* ; As appeared both in their Yellownesse and Sweetnesse. The *Cause* is, for that that Degree of *Heat* which is in *Lime*, and *Ashes* (being a Smothering *Heat*) is of all the rest most Proper, for it doth neither Liquefie, nor Arefie ; And that is true *Maturation*. Note that the taste of those *Apples* was good ; And therefore it is the *Experiment* fittest for Use.

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The *Apples*, Couered with *Crabs*, and *Onions*, were likewise well *Matured*. The *Cause* is, not any *Heat* ; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and spread them equally thorowout the *Body* ; which raketh away Hardnesse. So wee see one *Apple* ripeneth against another. And therefore in making of *Cider*, they turne the *Apples* first vpon a heape. So one *Cluster of Grapes*, that toucheth another whilst it groweth, ripeneth faster ; *Botrus contra Botrum citius maturescit*.

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The *Apples* in *Hay*, and the *Straw*, ripened apparantly, though not so much as the Other ; But the *Apple* in the *Straw* more. The *Cause* is, for that the *Hay* and *Straw* haue a very low degree of *Heat*, but yet Close and Smothering, and which drieth not.

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The *Apple* in the *Close Box*, was ripened also : The *Cause* is, for that all Aire, kept close, hath a degree of *warmth* : As wee see in *wooll*, *Fur*, *Plush*, &c.

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Note that all these were Compared with another *Apple*, of the same kinde, that lay of it selfe : And in Comparison of that, were more Sweet, and more Yellow ; and so appeared to be more Ripe.

Take an *Apple*, or *Peare*, or other like *Fruit*, and Rowle it vpon a Table hard : Wee see in Common Experience, that the *Rowling* doth Soften and Sweeten the *Fruit* presently ; Which is Nothing but the *Smooth Distribution* of the *Spirits* into the Parts : For the *Vnequall Distribution* of the *Spirits* maketh the Harshnesse : But this Hard *Rowling* is betweene *Concoction*, and a *Simple Maturation* ; Therefore, if you should Rowle them but gently, perhaps twice a day ; And continue it some fewen dayes, it is like they would *Mature* more finely ; and like vnto the *Natural Maturation*.

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Take an *Apple*, and cut out a Peece of the Top, and couer it, to see whether that *Solution of Continuity* will not hasten a *Maturation* ; We see

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that where a *Wasse*, or a *Flie*, or a *Worme* hath bitten, in a *Grape* or any *Fruit*, if it will sweeten hastily.

Take an *Apple*, &c. and pricke it with a *Pin* full of *Holes*, not deepe, and smeare it a little with *Sacke*, or *Cinnamon water*, or *Spirit of wine*, euery day for ten dayes, to see if the *Virtuall Heat* of the *wine*, or *Strong waters*, will not *Mature* it.

In these *Trialls* also, as was used in the first, set another of the same *Fruits* by, so *Compare* them; And try them: by their *Yellownesse*, and by their *Sweetnesse*.

Experiment
Solitary touching the
Making of Gold.

The *World* hath beene much abused by the *Opinion* of *Making of Gold*: The *Worke* it selfe I Iudge to bee possible; But the *Meanes* (hitherto propounded) to effect it, are, in the *Practice*, full of *Errour* and *Imposture*; And in the *Theory*, full of *vnfound Imaginations*. For to say, that *Nature* hath an *Intention* to make all *Metals* *Gold*. And that, if she were deliuered from *Impediments*, shee would performe her owne *Worke*; And that, if the *Crudities*, *Impurities*, and *Leprosities* of *Metalls* were cured, they would become *Gold*; And that a little *Quantity* of the *Medicine*, in the *Worke* of *Proiection*, will turne a *Sea* of the *Baser Metall* into *Gold*, by *Multipling*: All these are but *dreames*: And so are many other *Grounds* of *Alchymy*. And to helpe the *Matter*, the *Alchymists* call in likewise many *Vanities*, out of *Astrology*; *Naturall Magicke*; *Superstitious Interpretations* of *Scriptures*; *Auricular Traditions*; *Faigned Testimonies* of *Ancient Authors*; And the like. It is true, on the other side, they haue brought to light not a few profitable *Experiments*, and thereby made the world some amends. But wee, when wee shall come to handle the *Version* and *Transmutation* of *Bodies*; And the *Experiments* concerning *Metalls*, and *Mineralls*; will lay open the true *Wayes* and *Passages* of *Nature*, which may leade to this great *Effect*. And wee commend the wit of the *Cbineses*, who despaire of *Making of Gold*, but are *Mad* vpon the *Making of Silver*: For certaine it is, that it is more difficult to make *Gold*, (which is the most *Ponderous*, and *Materiate* amongst *Metalls*) of other *Metalls*, lesse *Ponderous*, and lesse *Materiate*; than (*via versa*) to make *Silver* of *Lead*. or *Quick-Silver*; Both which are more *Ponderous* than *Silver*, So that they need

need rather a further Degree of *Fixation*, than any *Condensation*. In the meane time, by Occasion of Handling the *Axiomes* touching *Maturation*, we will direct a *Triall* touching the *Maturing* of *Metalls*; and thereby Turning some of them into *Gold*: For wee conceiue indeed, that a perfect good *Concoction*, or *Disgestion*, or *Maturation* of some *Metalls*, will produce *Gold*. And here we call to minde, that we knew a *Dutch-man*, that had wrought himselte into the beleefe of a great Person, by vndertaking that hee could make *Gold*: whole discourse was, that *Gold* might be made; But that the *Alchymists* Ouer-fired the Worke: For (he said) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore that hee would doe it with a great Lampe, that should carry a Temperate and Equall Heat: And that it was the Worke of many Moneths. The Deuice of the Lampe was folly; But the Ouer-firing now vsed; And the Equall Heat to bee required; And the Making it a Worke of some good Time; are no ill Discourses.

Wee resort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The First is, that there be used a *Temperate Heat*; For they are euer *Temperate Heats* that *Disgest*, and *Nature*: Wherein wee meane *Temperate*, according to the *Nature* of the *Subiect*; For that may bee *Temperate* to *Fruits*, and *Liquors*, which will not worke at all vpon *Metalls*. The Second is, that the *Spirits* of the *Metall* bee quickened, and the *Tangible Parts* opened: For without those two Operations, the *Spirit* of the *Metall*, wrought vpon, will not bee able to disgest the *Parts*. The Third is, that the *Spirits* doe spread themselves *Euen*, and moue not *Subsultorily*; For that will make the *Parts* Close and, *Pliant*. And this requireth a *Heat*, that doth not rise and fall, but continue as *Equall* as may bee. The Fourth is, that no *Part* of the *Spirit* be emitted, but detained: For if there be *Emission* of *Spirit*, the *Bodie* of the *Metall* will bee *Hard*, and *Churlish*. And this will bee performed, partly by the Temper of the fire; And partly by the closenesse of the Vessell. The Fifth

Fifth is, that there bee *Choyce made of the likeliest and best Prepared Metall, for the Version* : For that will facilitate the worke. The Sixth is, that you giue *Time enough for the Worke* : Not to prolong Hopes (as the Alchymists doe;) but indeed to giue *Nature* a conuenient Space to worke in. These Principles are most certaine, and true; we will now deriue a direction of *Trial* out of them; which may (perhaps) by further Meditation, bee improved.

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Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* bee such, as may keepe the *Metall perpetually Moulten*, and no more; For that about all importeth to the Worke. For the *Materiall*, take *Siluer*, which is the *Metall* that in *Nature* Symbolizeth most with *Gold*; Put in also, with the *Siluer*, a Tenth Part of *Quick-siluer*, and a Twelfth Part of *Nitre*, by weight; Both these to quicken and open the Body of the *Metall*; And so let the Worke bee continued by the *Space of Six Moneths*, at the least. I wish also, that there be, at sometimes, an Injection of some *Oyled Substance*; Such as they vse in the Recouering of *Gold*: which by Vexing with Separations hath beene made Churlish: And this is to lay the Parts more Close and Smooth, which is the Maine Worke. For *Gold* (as wee see) is the Closest (and therefore the Heauiest) of *Metalls*: And is likewise the most Flexible, and Tenible. Note, that to thinke to make *Gold* of *Quick-siluer*, because it is the heauiest, is a Thing not to bee hoped; For *Quick-siluer* will not endure the Mannage of the *Fire*. Next to *Siluer*, I thinke *Copper* were fittest to be the *Materiall*.

Experiment
Solitary touch-
ing the Na-
ture of Gold.

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Gold hath these *Natures*; Greatnesse of weight; Closenesse of Parts; Fixation; Pliantnesse, or Softnesse; Immunity from Rust; Colour, or Tincture of Yellow. Therefore the Sure Way, (though most about,) to make *Gold*, is to know the *Causes* of the Seuerall *Natures* before rehearsed, and the *Axiomes* concerning the same. For if a Man can make a *Metall*, that hath all these *Properties*, Let Men dispute, whether it be *Gold* or no?

Experiments
in Confort
touching the
Enducing and
Accelerating of
Putrefaction.

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subject of a very Vniuersall Enquiry: For *Corruption* is a Reciprocall to *Generation*: And they Two, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the worke of the *Spirits* of *Bodies*, which euer are Vnquiet to Get forth, and Congregate with the *Aire*, and to enjoy the *Sun-beames*: The *Getting forth*, or *Spreading* of the *Spirits*, (which is a Degree of *Getting forth*,) hath five Differing Operations. If

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the *Spirits* be detained within the body, and moue more violently, there followeth *Colliquation*; As in *Metalls*, &c. If more Mildly, there followeth *Disgestion*, or *Maturation*; As in *Drinckes*, and *Fruits*. If the *Spirits* bee not meerey Detained, but Protrude a little, and that Motion be Confused, and Inordinate, there followeth *Putrefaction*; Which euer dissolueth the Consistence of the Body into much Inequality; As in *Flesh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Rust* of *Metals*. But if that Motion be in a certaine Order, there followeth *Vinification*, and *Figuration*; As both in *Liuing Creatures* bred of *Putrefaction*, and in *Liuing Creatures Perfect*. But if the *Spirits* issue out of the Body, there followeth *Desiccation*, *Induration* *Consumption*, &c. As in *Bricke*, *Evaporation* of *Bodies Liquid*, &c.

The Meanes to Enduce and Accelerate *Putrefaction*, are; First by Adding some Crude or watry Moisture; As in Wetting of any *Flesh*, *Fruit*, *Wood*, with *water*, &c. For contrariwise *Vntuous* and *Oily Substances* preserve.

The Second is by *Invitation* or *Excitation*; As when a *Rotten Apple* lyeth close to another *Apple*, that is *sound*: Or when *Dung* (which is a Substance already *Putrified*) is added to other Bodies. And this is also notably seene in *Church-yards*, where they bury much; Where the Earth will consume the *Corps*, in farre shorter time, than other Earth will.

The Third is, by *Closenesse*, and *Stopping*, which detaineth the *Spirits*, in *Prison*, more than they would; And thereby irritateth them to seeke Issue; As in *Corne*, and *Cloaths*, which wax *Musty*; and therefore *Open Aire* (which they call *Aer perstabilis*) doth preserve: and this doth appeare more Evidently in *Agues*, which come (most of them,) of *Obstructions*, and *Penning* the *Humours*, which there upon *Putrifie*.

The Fourth is, by *Solution of Continuity*; As we see an *Apple* will rot sooner, if it be *Cut* or *Pierced*; And so will *Wood*, &c. And so the *Flesh* of *Creatures* aline, where they haue receiued any *Wound*.

The Fifth is, either by the *Exhaling*, or by the *Drining backe* of the *principall Spirits*, which preserve the Consistence of the *Body*; So that when their *Gouernment* is *Dissolued*, euery *Part* returneth to his *Nature* or *Homogeny*. And this appeareth in *Vrine*, and *Bloud*, when they coole, and thereby breake; It appeareth also in the *Gangrene*, or *Mortification* of *Flesh*, either by *Opiates*, or by *Intense Colds*. I conceiue also the same Effect is in *Pestilences*, for that the *Malignitie* of the *Infesting Vapour*, daunceth the *Principall Spirits*, and maketh them fly, and leaue their *Regiment*; And then the *Humours*, *Flesh*, and *Secondary Spirits*, doe dissolue and breake, as in an *Anarchy*:

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The Sixth is, when a *Forraine Spirit*, Stronger and more Eager than the *Spirit of the Body*, entrencheth the *Body*; As in the Stinging of Serpents. And this is the Cause (generally) that vpon all *Poysons* followeth *Swelling*: And we see *Swelling* followeth also, when the *Spirits* of the *Body* it selfe, Congregate too much; As vpon *Blowes*, and *Bruises*; Or when they are *Pent in too much*, as in *Swelling* vpon *Cold*. And we see also, that the *Spirits* comming of *Putrefaction* of *Humours* in *Agues*, &c, which may be counted as *Forraine Spirits*, though they be bred within the *Body*, do Extinguish and Suffocate the *Naturall Spirits*, and *Heat*.

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The Seueneth is, by such a *weake Degree of Heat*, as setteth the *Spirits* in a little *Motion*, but is not able, either to digest the *Parts*, or to Issue the *Spirits*, As is seen in *Flesh* kept in a *Roome* that is not *Coole*: Whereas in a *Coole* and *Wet Larder* it will keepe longer. And we see, that *Vinification* (whereof *Putrefaction* is the *Bastard Brother*,) is effected by such *Soft Heats*; As the *Hatching* of *Egges*; The *Heat* of the *Wombe*, &c.

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The Eighth is, by the *Releasing* of the *Spirits*, which before were close kept by the *Solidnesse* of their *Couerture*, and thereby their *Appetite* of *Issuing* checked; As in the *Artificiall Rusts* induced by strong *Waters*, in *Iron*, *Lead*, &c. And therefore *wetting* hasteneth *Rust*, or *Putrefaction* of any thing, because it softeneth the *Crust*, for the *Spirits* to come forth.

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The Ninth is, by the *Enterchange* of *Heat* and *Cold*, or *wet* and *drie*; As wee see in the *Moulding* of *Earth* in *Frosts*, and *Sunne*; And in the more hastie *Rotting* of *Wood*, that is sometimes *wet*, sometimes *drie*.

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The tenth is, by *Time*, and the *worke* and *Procedure* of the *Spirits* themselves, which cannot keepe their *Station*; Especially if they be left to themselves, And there be not *Agitation* or *Locall Motion*. As wee see in *Corne* not stirred; And mens *Bodies* not exercised.

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All *Moulds* are *Inceptions* of *Putrefaction*; As the *Moulds* of *Pyes*, and *Flesh*; the *Moulds* of *Orenge*s, and *Limon*s; which *Moulds* afterwards turne into *Wormes*, or more odious *Putrefactions*: And therefore (commonly,) prone to be of ill *Odour*. And if the *Body* be *Liquid*, and not apt to *Putrifie* totally; it will cast vp a *Mother* in the *Top*; As the *Mothers* of *Distilled waters*.

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Mosse is a *Kind* of *Mould*, of the *Earth*, and *Trees*. But it may be better sorted as a *Rudiment* of *Germination*; To which we referre it.

Experiments
in Consort
touching Pre-
hibiting and
Preventing Pu-
trefaction.

It is an *Enquiry* of *Excellent vse*, to *Enquire* of the *Meanes* of *Preventing* or *Staying Putrefaction*; For therein consisteth the *Meanes* of *Conservation* of *Bodies*; For *Bodies* haue two *Kindes* of *Dissolutions*; The one by *Consumption*, and *Desiccation*; The other by *Putrefaction*. But as for the *Putrefactions*

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of the *Bodies* of Men, and *Living Creatures*, (as in Agues, Wormes, Consumptions of the Lungs, Impostumes, and Vicers both Inwards and Outwards,) they are a great *Part* of *Physicke*, and *Surgery*: And therefore wee will referue the *Enquiry* of them to the proper Place, where wee shall handle *Medicinall Experiments* of all Sorts. Of the rest we will now Enter into an *Enquiry*: wherein much light may be taken, from that which hath beene said, of the *Meanes* to *Enduce* or *Accelerate Putrefaction*: For the Remouing that, which caused *Putrefaction*, doth *Preuent* and *Auoid Putrefaction*.

The first *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: For so we see that Meat and Drinke will last longer, Vnputrified, or Vnsoured, in Winter, than in Summer: And wee see that Flowers, and Fruits, put in *Conseruatories* of Snow, keepe fresh. And this worketh by the *Detention* of the *Spirits*, and *Constipation* of the *Tangible Parts*.

The second is *Astriction*: For *Astriction* prohibiteth *Dissolution*: As we see (generally) in *Medicines*, whereof such as are *Astringents* doe inhibit *Putrefaction*: And by the same reason of *Astringency*, some small Quantity of Oile of Vitrioll, will keepe fresh Water long from *Putrefying*. And this *Astriction* is in a Substance that hath a *Virtuall Cold*, And it worketh (partly) by the same *Meanes* that *Cold* doth.

The Third is, the *Excluding* of the *Aire*; And againe, the *Exposing* to the *Aire*: For these Contraries, (as it commeth often to passe,) worke the same Effect, according to the Nature of the Subiect Matter. So we see, that *Beere*, or *wine*, in Bottles close stopped, last long; That the *Garners* under Ground keepe Corne longer than those aboue Ground; And that *Fruit closed in Wax* keepeth fresh: And likewise *Bodies* put in *Honey*, and *Flower*, keepe more fresh: And *Liquors*, *Drinkes*, and *Suyces*, with a little Oyle cast on the Top, keepe fresh. Contrariwise, we see that *Cloth* and *Apparell*, not *Aired* doe breed Moathes, and Mould; and the Diuersity is, that in *Bodies* that need *Detention* of *Spirits*, the *Exclusion* of the *Aire* doth good; As in *Drinkes*, and *Corne*: But in *Bodies* that need *Emission* of *Spirits*, to discharge some of the Superfluous Moisture, it doth hurt, for they require *Airing*.

The Fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Rest*; For the Subtill *Motion*, which *Putrefaction* requireth, is disturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrall, and their Parts together; As wee see that Turning ouer of Corne in a Garner; Or Letting it runne like an Houre-glasse, from an vpper Roome into a Lower, doth keepe it Sweet: And Running Waters putrefie not: And in Mens *Bodies*, Exercise hindereth *Putrefaction*; And contrariwise *Rest*, and want of *Motion*, or Stoppings, (whereby the Runne of Humours, or the Motion of Perspiration, is staid,) further *Putrefaction*; As wee partly touched a little before.

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345 The Fifth is, the *Breathing forth of the Aduentitious Moisture in Bodies*; For as *wetting* doth halten *Putrefaction*; So *Conuenient Drying*, (whereby the more *Radicall Moisture* is onely kept in,) putterh backe *Putrefaction*: So we see that *Herbs*, and *Flowers*, if they be dried in the Shade; Or dried in the hot Sunne, for a small time keepe best. For the *Emission* of the *Loose* and *Aduentitious Moisture*, doth betray the *Radicall Moisture*; And carrieth it out for Company.

346 The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth Bodies from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a *Strong Spirit* likewise preserueth, and a *Weake* or *Faint Spirit* disposeth to *Corruption*. So wee finde that *Salt water* corrupteth not so soone as *Fresh*: And *Salting of Oysters*, and *Powdring of Meat*, keepeth them from *Putrefaction*. It would bee tried also, whether *Chalke* put into *Water*, or *Drinke*, doth not preserue it from *Putrefying*, or speedy *Souring*. So we see that *Strong Beere* will last longer than small; And all Things, that are hot and *Aromaticall*, doe helpe to preserue *Liquors*, or *Powders*, &c. Which they doe, as well by *Strengthening the Spirits*, as by *Soaking out the loose Moisture*.

347 The Seuenenth is, *Separation of the Cruder Parts*, and thereby making the *Body more Equall*; for all vnperfect Mixture is apt to *Putrefie*; And *Watry Substances* are more apt to *Putrefie*, than *Oily*. So wee see distilled *Waters* will last longer than *Raw Waters*; And things that haue passed the *Fire*, doe last longer, than those that haue not passed the *Fire*; As *Dried Peares*, &c.

348 The Eighth is, the *Drawing forth continually of that Part, where the Putrefaction beginneth*; Which is (commonly) the *Loose and Watry Moisture*; Not only for the Reason before giuen, that it prouoketh the *Radicall Moisture* to come forth with it; But because being detained in the *Body*, the *Putrefaction* taking hold of it, infecteth the rest: As we see in the *Embalming dead Bodies*: And the same Reason is of *Preseruing Herbs*, or *Fruits*, or *Flowers*, in *Bran*, or *Meale*.

349 The Ninth is, the *Commixture of any Thing that is more Oily, or Sweet*: For such *Bodies* are least apt to *Putrefie*, the *Aire* working little vpon them: And they not putrefying preserue the rest. And therefore wee see *Syraps*, and *Ointments*, will last longer, than *Iuyces*.

350 The Tenth is, the *Commixture of somewhat that is Dry*; For *Putrefaction* beginneth first from the *Spirits*; And then from the *Moisture*: And that that is drie is vnapt to putrefie: And therefore *Smoake* preserueth *Flesh*; As wee see in *Bacon*, and *Neats-Tongues*, and *Martlemas Beefe*, &c.

351 The Opinion of some of the *Ancients*, that *Blowne Aires* doe preserue *Bodies*, longer than other *Aires*, seemeth to Mee Probable; For that the *Blowne Aires*, being *Over-charged* and *Compressed*, will hardly receiue the *Exhaling* of any Thing, but rather repulse it. It was tried in a *Blowne Bladder*, whereinto *Flesh* was put, and likewise a *Flower*, and it sorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather

ther

ther further *Putrefaction* : The way were therefore, to blow throngly, with a Paire of Bellowes, into a Hoghead, putting into the Hoghead (before) that which you would haue preserued ; And in the instant that you withdraw the Bellowes, stop the Hole close.

THe Experiment of Wood that *Shineth* in the *Darke*, we haue diligently driuen, and pursued : The rather, for that of all Things, that giue Light here below, it is the most durable ; And hath least Apparent Motion. *Fire* and *Flame* are in continuall Expende ; *Sugar* shineth onely while it is in Scraping ; And *Salt-water* while it is in Dashing ; *Glow-wormes* haue their Shining while they liue, or a little after. Onely *Scales* of *Fishes* (Putrified) seeme to bee of the same Nature with *Shining wood* : And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The Triall sorteth thus. 1. The *Shining* is in some Peeces more *Bright*, in some more *Dimme* ; but the most *Bright* of all doth not attaine to the Light of a *Glow-worme*. 2. The *woods* that haue beene tried to shine, are chiefly *Sallow* and *willow* ; Also the *Ash*, and *Hasle* ; It may bee, it holdeth in others. 3. Both *Roots*, and *Bodies* doe shine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Day-light, is in some Peeces *white*, in some Peeces inclining to *Red* ; Which in the Countrey they call the *White*, and *Red Garret*. 5. The Part that Shineth, is, (for the most part) somewhat *Soft*, and *Moist* to feele to ; But some was found to bee *Firme*, and *Hard* ; So as it might bee figured into a Crosse, or into Beads, &c. But you must not looke to haue an Image, or the like, in any thing that is *Lightsome* ; For euen a face in Iron red Hot will not bee seene, the Light confounding the small differences of *Lightsome* and *Darksome*, which shew the figure. 6. There was the *Shining Part* pared off, till you came to that, that did not Shine ; But within two Dayes the *Part Contiguous* beganne also to *Shine*, being laid abroad in the Dew ; So as it seemeth the *Putrefaction* spreadeth. 7. There was other dead wood of like kinde, that was laid abroad, which *Shined* not at the first ; but after a Nights lying abroad began to *Shine*. 8. There was other wood, that did *First shine* : And being laid dry in the House, within five or six dayes, *Lost* the *shining* ; And laid abroad againe, *Recouered* the *Shining*. 9. *Shining Woods*, being laid in a *Dry Roome*, within a Seuen night, lost their *Shining* ; But being laid in a *Cellar*, or *Darke Roome*, kept the *Shining*. 10. The *Boaring of Holes*, in that kinde of Wood, and then laying it abroad, seemeth to conduce to make it *Shine* : The Cause is, for that all *Solution* of *Continuity* doth helpe on *Putrifaction*, as was touched before. 11. No wood hath beene yet tried to *Shine*, that was cut *dayne a line*, but such as was *Rotted*, both in *Stocke*, and *Root*, while it grew. 12. Part of the wood that *Shined*, was steeped in *Oyle*, and retained the *Shining* a Fortnight. 13. The like succeeded in some steeped in *water*, and much better. 14. How long the *Shining* will continue, if the wood bee laid abroad euery Night, and taken in and sprinkled with *water* in the Day, is not yet tried. 15. Triall was

Experiment
Solitary touch-
ing Wood
Shining in the
Darke.

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made of *laying it abroad in Frosty weather*, which hurt it not. 16. There was a great *Peecce* of a *Root* which did shine, and the *Shining Part* was *Cut off*, till no more Shined; Yet after two Nights, though it were kept in a dry Roome, it got a *Shining*.

Experiment
Solitary touch-
ing the Accel-
eration of Birth.

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THe *Bringing forth* of *Living Creatures* may bee *accelerated* in two *Respects*: The one, if the *Embryon ripeneth* and perfecteth sooner: The other if there be some Cause from the *Mothers Body*, of *Expulsion* or *Putting it downe*: whereof the Former is good, and argueth strength; The Latter is ill, and commeth by Accident or Disease. And therefore the *Ancient Observation* is true, that the *Childe borne in the seventh Moneth*, doth commonly well; But *Borne in the Eighth Moneth*, doth (for the most part) die. But the *Cause* assigned is *Fabulous*; Which is, that in the Eighth Moneth, should bee the *Returne* of the *Reigne*, of the *Planet Saturne*: which (as they say) is a *Planet Maligne*; whereas in the *Seventh* is the *Reigne* of the *Moone*, which is a *Planet Propitious*. But the true *Cause* is, for that where there is so great a *Preuention* of the Ordinary time, it is the *Lustinesse* of the *Childe*; But when it is lesse, it is some *Indisposition* of the *Mother*.

Experiment
Solitary touch-
ing the Accel-
eration of
growth and
Stature.

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TO *Accelerate Growth* or *Stature*, it must proceed; Either from the *Plenty* of the *Nourishment*; Or from the *Nature* of the *Nourishment*; Or from the *Quickening* and *Exciting* of the *Naturall Heat*. For the first, *Excesse* of *Nourishment* is hurtfull; For it maketh the *Childe* Corpulent; And Growing in Breadth, rather than in Height. And you may take an Experiment from *Plants*, which, if they spread much, are seldome tall. As for the *Nature* of the *Nourishment*; First, it may not bee too *Dry*; And therefore Children in *Dayry Countries* doe wax more tall, than where they feed more vpon Bread, and Flesh. There is also a received Tale; That *Boyling* of *Dasie Roots* in *Milke* (which it is certaine are great *Driers*) will make *Dogs* little. But so much is true, that an *Over-drie* *Nourishment* in *Childhood* putteth backe *Stature*. Secondly, the *Nourishment* must be of an *Opening Nature*; For that *Attenuateth* the *Iuyce*, and furthereth the *Motion* of the *Spirits*, y^pwards. Neither is it without Cause, that *Xenophon*, in the *Nouriture* of the *Persian Children*, doth so much commend their Feeding vpon *Cardamon*; which (hee saith) made them grow better, and bee of a more *Active Habit*. *Cardamon* is in Latine *Nasturtium*; And with vs *water-Cresses*; Which, it is certaine, is an *Herbe*, that whilest it is young, is *Friendly* to *Life*. As for the *Quickning* of *Naturall Heat*, it must bee done chiefly with *Exercise*; And therefore (no doubt) much *Going* to *Schoole*, where they sit so much, hindereth the *Growth* of *Children*; whereas *Countrey People*, that goe not to *Schoole*, are commonly of better *Stature*. And againe Men must beware, how they giue *Children*, any thing that is *Cold* in *Operation*; For euen *Long-Sucking* doth hinder both *Wit*, and *Stature*. This hath beene tried, that a *Whelp*, that hath beene fed with *Nitre* in *Milke*, hath be-

come

come very little, but extreme lively: For the *Spirit* of *Nitre* is *Cold*. And though it be an Excellent Medicine, in Strength of yeares, for Prolongation of Life; yet it is, in Children and young Creatures, an Enemy to *Growth*: And all for the same Reason; For *Heat* is requisite to *Growth*: But after a Man is come to his Middle Age, *Heat* consumeth the *Spirits*; which the Coldnesse of the Spirit of *Nitre* doth helpe to condense, and correct.

There be two Great Families of Things: You may terme them by severall Names; *Sulphureous* and *Mercurial*, which are the *Chymists* Words: (For as for their *Sal*, which is their Third Principle, it is a Compound of the other two;) *Inflammable* and *Not Inflammable*; *Mature* and *Crude*; *Oily* and *Watry*. For wee see that in *Subterrancies* there are, as the *Fathers* of their *Tribes*, *Brimstone* and *Mercury*: In *Vegetables*, and *Living Creatures*, there is *Water* and *Oyle*: In the *Inferiour Order* of *Pneumaticalls* there is *Aire* and *Flame*: And in the *Superiour*, there is the *Body* of the *Starre*, and the *Pure Sky*. And these Paires, though they bee vnlike in the *Primitive Differences* of *Matter*, yet they seeme to haue many *Consents*: For *Mercury* and *Sulphure* are principall *Materialls* of *Metalls*; *Water* and *Oyle* are principall *Materials* of *Vegetables* and *Animals*; And seeme to differ but in *Maturation*, or *Concoction*: *Flame* (in *Vulgar Opinion*) is but *Aire Incensed*; And they both haue *Quicknesse* of *Motion*, and *Facility* of *Cession*, much alike: And the *Interstellar Skie*, (though the *Opinion* be vaine, that the *Starre* is the *Denser Part* of his *Orbe*) hath notwithstanding so much *Affinity* with the *Starre*, that there is a *Rotation* of that, as well as of the *Starre*. Therefore, it is one of the greatest *Magnalia Natura*, to turne *Water*, or *Watry Iuyce*, into *Oyle* or *Oily Iuyce*: Greater in *Nature*, than to turne *Siluer*, or *Quick-Siluer*, into *Gold*.

The *Instances* we haue, wherein *Crude* and *watry* Substance turneth into *Fat* and *Oily*, are of foure kinds. First in the *Mixture* of *Earth* and *Water*, which mingled by the helpe of the *Sun*, gather a *Nitrous Fatnesse*, more than either of them haue severally; As wee see, in that they put forth *Plants*, which need both *Iuyces*.

The Second is in the *Assimilation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Living Creatures*; Whereof *Plants* turne the *Iuyce* of meere *water* and *Earth*, into a great deale of *Oily Matter*: *Living Creatures*,

Experiments
in Consort,
touching Sul-
phur and Mer-
cury, two of Pa-
racelsus Princi-
ples

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tures, though much of their *Fat* and *Flesh*, are out of *Oily Aliments*, (as *Meat* and *Bread*) yet they Assimilate also in a Measure their *Drinke* of *Water*, &c. But these two Wayes of *Version* of *water* into *Oyle*, (namely by *Mixture*, and by *Assimilation*) are by many Passages, and Percolations, and by long Continuance of soft *Heats*, and by Circuits of Time.

357 The third is in the *Inception* of *Putrefaction*; As in *Water Corrupted*; And the *Mothers* of *Waters Distilled*; Both which have a kinde of *Fatnesse* or *Oyle*.

358 The Fourth is in the *Dulcoration* of some *Metalls*; as *Saccharum Saturni*, &c.

359 The Intention of *Version* of *water* into a more *Oily Substance*, is by *Disgestion*; For *Oile* is almost Nothing else but *water digested*; And this *Disgestion* is principally by *Heat*; Which *Heat* must be either *Outward*, or *Inward*: Again, it may be by Prouocation, or Excitation; Which is caused by the Mingling of Bodies already *Oily* or *Disgested*; For they will somewhat Communicate their Nature with the rest. *Disgestion* also is strongly effected by direct *Assimilation*, of *Bodies Crude* into *Bodies Disgested*; As in *Plants*, and *Living Creatures*, whose Nourishment is far more Crude than their Bodies: But this *Disgestion* is by a great Compasse, as hath beene said. As for the more full handling of these two Principles, whereof this is but a Taste; (the Enquiry of which is one of the Profoundest Enquiries of Nature) Wee leaue it to the Title of *Version* of *Bodies*; And likewise to the Title of the *First Congregations* of *Matter*; Which like a Generall Assemblie of Estates, doth giue Law to all *Bodies*.

Experiment
Solitary touch-
ing *Chameleons*.

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A *Chameleon* is a Creature about the Bignesse of an Ordinary *Lizard*: His Head vnproportionably big; His Eyes great: Hee moueth his Head without the writhing of his Necke (which is inflexible) as a *Hogge* doth: His Backe crooked; His Skin Spotted with little Tumours, lesse Eminent nearer the Belly; his Taile slender, and long: On each Foot he hath fve Fingers; three on the Outside, and two on the Inside; His Tongue of a Maruellous Length in respect of his Body, and hollow at the end; Which hee will launch out to prey vpon *Flies*. Of Colour Greene, and of a dusky Yellow, brighter and whiter towards the Belly; Yet spotted with Blew, White, and Red. If hee bee laid vpon Greene, the Greene predominateth; If vpon Yellow, the Yellow; not so if he be laid vpon Blew, or Red, or White; Onely the Greene Spots receiue a more Orient Lustre: Laid vpon Blacke, hee looketh all Blacke, though not without a Mixture of Greene. Hee feedeth not onely vpon Aire (though that bee his principall Sustenance;) For sometimes hee taketh *Flies*, as was said; Yet some that haue kept *Chameleons* a whole yeere together, could neuer perceiue that euer they fed vpon any Thing else but Aire; And might obserue their Bellies to swell after they had exhausted the Aire, and closed their Iawes; Which they open commonly

monly against the Rayes of the Sunne. They haue a foolish Tradition in *Magicke*, that if a *Chamelion* be burnt vpon the Top of a House, it will raise a Tempest; Supposing (according to their vaine Dreames of *Sympathies*) because he nourisheth with Aire, his Body should haue great vertue to make Impression vpon the Aire.

IT is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions* of *Flames* out of *Plaines*; And that those *Flames* are cleere; and cast not forth such *Smoake*, and *Ashes*, and *Pumice*, as *Mountain Flames* do. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountaines*, and *Earth-quakes* which cast *Flame*. There be also some *Blind Fires*, vnder *Stone*, which flame not out, but *Oile* being powdered vpon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choaked, as not able to remoue the *Stone*, it is *Heat*, rather than *Flame*; Which neuerthelesse is sufficient to Enflame the *Oile*.

IT is reported, that in some *Lakes*, the *water* is so *Nitrous*, as if *Foule* *Cloathes* be put into it, it scoureth them of it selfe: And if they stay any whit long, they moulder away. And the Scouring Vertue of *Nitre* is the more to be noted, because it is a *Body Cold*; And wee see warme *Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtill Spirit, which seuereth and diuideth any thing that is foule, and Viscous, and sticketh vpon a *Body*.

TAKE a *Bladder*, the greatest you can get; Fill it full of *Wind*, and tye it about the Necke with a silke thred waxed; And vpon that put likewise *Wax* very close; So that when the Necke of the *Bladder* drieth, no *Aire* may possibly get in, or out. Then bury it three or foure foot vnder the *Earth*, in a *Vault*, or in a *Conservatory* of *Snow*, the *Snow* being made hollow about the *Bladder*; And after some Fortnights distance, see whether the *Bladder* be shrunk: For if it be, then it is plain that the *Coldnesse* of the *Earth*, or *Snow*, hath Condensed the *Aire*, and brought it a Degree nearer to *water*: Which is an Experiment of great Consequence.

IT is a report of some good credit, that in *Deepe Canes*, there are *Pensile Crystall*, and *Degrees* of *Crystall* that drop from aboue; And in some other, (though more rarely) that rise from below. Which though it be chiefly the worke of *Cold*, yet it may bee, that *Water*, that passeth thorow the *Earth*, gathereth a Nature more clammy, and fitter to Congeale, and become Solid, than *Water* of it selfe. Therefore Triall would be made, to lay a Heape of *Earth*, in great *Frosts*, vpon a Hollow Vessell, putting a Canase betweene, that it falleth not in And powre *Water* vpon it, in such Quantity, as will be sure to soake thorow; And see whether it will not make an harder Ice in the bottome of the Vessel,

Experiment
Solitary touching
Subterrany Fires.

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Experiment
Solitary touching
Nitre.

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Experiment
Solitary touching
Congealing of Aire.

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Experiment
Solitary touching
Congealing of Water
into Crystall.

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and lesse apt to dissolue, than ordinarily. I suppose also, that if you make the Earth narrower at the bottome, than at the Top, in fashion of a Sugar Loafe Reuersed, it will helpe the Experiment. For it will make the Ice, where it Issueth, lesse in Dulke; and euermore Smalnesse of Quantity is a Helpe to *Version*.

Experiment
Solitary
touching Pre-
seruing of Rose-
leaves both in
colour & smell.

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Take *Damaske Roses*, and pull them; Then drie them vpon the Top of an House, vpon a Lead or Tarras, in the hot Sunne, in a cleere day, betweene the Houres (onely) of twelue and two; or there abouts. Then put them into a Sweet Dry Earthen Bottle, or a Glasse, with narrow Mouthes, stuffing them close together, but without Bruising: Stop the Bottle or Glasse close, and these *Roses* will retaine, not onely there smell Perfect, but their Colour fresh, for a yeare at least. Note, that Nothing doth so much destroy any Plant, or other Body, either by *Putrefaction*, or *Arefaction*, as the *Aduentitious Moisture*, which hangeth loose in the Body, if it be not drawne out. For it betrayeth and tolleth forth the *Innate* and *Radical Moisture*, along with it, when it selfe goeth forth. And therefore in *Living Creatures*, Moderate Sweat doth preserue the Iuice of the Body. Note that these *Roses*, when you take them from the *Drying*, haue little or no smell, So that the Smell is a Second *Smell*, that issueth out of the *Flower* afterwards.

Experiments
in Confort
touching the
Continuance of
Flame.

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The Continuance of Flame, according vnto the diuersity of the Body Enflamed, & other Circumstances, is worthy the Enquiry; Chiefly, for that though Flame be (almost) of a Momentany Lasting, yet it receiuerh the More, and the Lesse: we will first therefore speake (at large) of Bodies Enflamed, wholly, and immediatly, without any *wicke* to helpe the *Inflammation*. A Spoonfull of *Spirit of Wine*, a little heated, was taken, and it burnt as long as came to 116 Pulses. The same Quantity of *Spirit of wine*, Mixed with the Sixth Part of a Spoonfull of *Nitre*, burnt but to the space of 94. Pulses. Mixed with the like Quantity of *Bay salt*, 83. Pulses. Mixed with the like Quantity of *Gunpowder*, which dissolued into a Blacke water, 110. Pulses. A Cube, or Peller of *Yellow Wax*, was taken, as much as halfe the *Spirit of wine*, and set in the Middest, and it burnt onely to the space of 87. Pulses; Mixed with the Sixth Part of a spoonfull of *Milke*, it burnt to the space of 100. Pulses; And the *Milke* was crudled. Mixed with the Sixth Part of a spoonfull of *water*, it burnt to the space of 86. Pulses; With an Equall Quantity of *water*, onely to the space of 4. Pulses. A Small *Pebble* was laid in the Middest; and the *Spirit of Wine* burnt to the space of 94. Pulses. A Peece of *Wood*, of the bignesse of an Arrow, and about a Fingers length, was set vp in the Middest, and the *Spirit of Wine* burnt to the space of 94. Pulses. So that the *Spirit of wine* Simple, endured the longest; And the *Spirit of wine* with the *Bay-Salt*, and the Equall Quantity of *water*, were the shortest.

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Consider well, whether the more speedy Going forth of the flame, bee caused,

caused, by the Greater Vigour of the Flame in Burning; Or by the Resistance of the Body mixed, and the Auersion thereof to take Flame: Which will appeare by the Quantity of the Spirit of wine, that remaineth after the Going out of the Flame. And it seemeth clearely to be the latter; For that the Mixture of Things least apt to burne, is the Speediest in going out. And note, by the way, that Spirit of Wine burned, till it goe out of it selfe, will burne no more, And tasteth nothing so hot in the Mouth, as it did; No nor yet sower, (as if it were a degree towards Vineger,) which Burnt wine doth; but flat and dead.

Note, that in the Experiment of wax aforesaid, the wax dissolued in the burning, and yet did not incorporate it selfe, with the Spirit of Wine, to produce one Flame; but wheresoever the Wax floated, the Flame forsooke it, till at last it spread all ouer, and put the Flame quite out.

The Experiments of the Mixtures of the Spirit of wine enflamed, are Things of Discouery, and not of Vse: But now wee will speake of the Continuance of Flames, such as are vsed for Candles, Lampes, or Tapers; consisting of Inflammable Matters, and of a wieke that prouoketh Inflammation. And this importeth not only Discouery, but also Vse and Profit; For it is a great Sauing, in all such Lights, if they can be made as faire and bright as others, and yet last longer. Wax Pure made into a Candle, and Wax Mixed seuerally into Candle-stuffe, with the Particulars that follow; (viz. water, Aqua-vita, Milk, Bay-salt, Oyle, Butter, Nitre, Brimstone, Saw-dust,) Euery of these bearing a Sixth Part to the wax; And euery of these Candles mixed, being of the same Weight and Wieke with the wax Pure, proued thus in the Burning, and Lasting. The swiftest in Consuming was that with Saw-dust; Which first burned faire, till some part of the Candle was consumed, and the Dust gathered about the Snafte; But then it made the Snafte bigge, and long, and to burne dusky, and the Candle wasted in halfe the time of the wax Pure. The next in Swiftnesse, were the Oyle, and Butter, which consumed, by a Fifth part, swifter than the Pure wax. Then followed in Swiftnesse the Cleare wax it selfe. Then the Bay-Salt, which lasted about an Eighth Part longer than the Cleare wax. Then followed the Aqua-vita, which lasted about a Fifth part longer than the Cleare wax. Then followed the Milk, and water, with little difference from the Aqua-vita; but the Water slowest. And in these foure last, the wieke would spit forth little Sparkes. For the Nitre, it would not hold lighted about some Twelve Pulses; But all the while it would spit out Portions of Flame, which afterwards would goe out into a vapour. For the Brimstone, it would hold lighted, much about the same time with the Nitre; But then after a litle while, it would harden and cake about the Snafte; So that the Mixture of Bay-Salt with wax, will win an Eighth part of the time of lasting, and the water a Fifth.

After the Seuerall Materialls were tried, Triall was likewise made of seuerall wickes; As of Ordinary Cotton; Sowing Thred; Rush; silke, Straw; and wood. The Silke, Straw, and wood, would flame a litle, till they

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they came to the *Wax*, and then goe out : of the Other Three, the *Threed* consumed faster than the *Cotton*, by a Sixth part of Time : The *Cotton*, next : Then the *Rush* consumed slower than the *Cotton*, by at least a third part of time. For the Bignesse of the *Flame*, the *Cotton*, and *Thred*, cast a *Flame* much alike ; and the *Rush* much lesse, and dimmer. *Quere*, whether *wood*, and *wiekes* both, as in *Torches*, consume faster, than the *Wiekcs Simple*.

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We haue spoken of the Seuerall *Materialls*, and the Seuerall *wiekcs*: But to the *lasting* of the *Flame*, it importeth also, Not only what the *Materiall* is, but in the same *Materiall*, whether it be Hard, Soft, Old, New, &c. Good *Houfwinies*, to make their *Candles* burne the longer, vse to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and so they Consume the slower: In so much, as by this meanes, they will outlast other *Candles*, of the same *Stuffe*, almost Halfe in Halfe. For *Bran* and *Flower* haue a Vertue to Harden : So that both Age, and lying in the *Bran*, doth helpe to the *Lasting*. And we see that *wax Candles* last longer than *Tallow Candles*, because *wax* is more firme, and hard.

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The *Lasting* of *Flame* also dependeth vpon the easie *Drawing* of the *Nourishment*; As we see in the *Court of England*, there is a Seruice which they call *All-night*; which is (as it were) a great Cake of *Wax*, with the *Wicke* in the Middest, whereby it commeth to passe, that the *Wicke* fetcheth the *Nourishment* further off. We see also that *Lamps* last longer, because the Vessell is farre broader, than the Breadth of a Taper, or Candle.

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Take a *Turretted Lampe* of *Tinne*, made in the forme of a Squire; The Height of the *Turret* being thrice as much, as the length of the lower part whereupon the *Lampe* standeth : Make only one Hole in it, at the End of the Returne furthest from the *Turret*. Reuerse it, and fill it full of *Oile*, by that Hole; And then set it vpright againe; And put a *Wicke* in at the Hole; And lighten it: You shall finde that it will burne slow, and a long time. Which is caused, (as was said last before,) for that the *Flame* fetcheth the *Nourishment* as farre off. You shall finde also, that as the *Oile* wasteth, and descendeth, so the Top of the *Turret*, by little and little, filleth with *Aire*; which is caused by the Rarefaction of the *Oile* by the Heat. It were worthy the Obseruation, to make a Hole, in the Top of the *Turret*, and to trie, when the *Oile* is almost consumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good also to haue the *Lampe* made, not of *Tinne*, but of *Glasse*, that you may see how the Vapour, or *Aire* gathereth, by degrees, in the Top.

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A Fourth Point, that importeth the *lasting* of the *Flame*, is the *Clofeness* of the *Aire*, wherein the *Flame* burneth. We see, that if *Wind* bloweth vpon a *Candle*, it wasteth apace. We see also, it lasteth longer in a *Lanthorne*, than at large. And there are Traditions of *Lampes*, and *Candles*, that haue burnt a very long time, in *Caves*, and *Tombs*.

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A fifth Point, that importeth the *Lasting* of the *Flame*, is the *Nature* of

of the *Aire*, where the *Flame* burneth; whether it bee Hot or Cold, Moist or Drie. The *Aire*, if it be very Cold, irritateth the *Flame*, and maketh it burne more fiercely; (As Fire scorcheth in Frosty weather;) And so furthereth the *Consumption*. The *Aire* once heated, (I conceive) maketh the *Flame* burne more mildly, and so helpeth the *Continuance*. The *Aire*, if it be Drie, is indifferent: The *Aire*, if it be Moist, doth in a Degree quench the *Flame*: (As we see *Lights* will goe out in the *Damps* of *Mines*;) And howsoever maketh it burne more dully: And so helpeth the *Continuance*.

B*urials* in Earth serue for *Preseruati*on; And for *Condensation*; And for *Induration* of *Bodies*. And if you intend *Condensation*, or *Induration*, you may bury the *Bodies* so, as *Earth* may touch them: As if you will make *Artificiall Porcellane*, &c. And the like you may doe for *Conservation*, if the *Bodies* be Hard and Solid; As Clay, Wood, &c. But if you intend *Preseruati*on of *Bodies*, more Soft and Tender, then you must doe one of these two: Either you must put them in *Cases*, whereby they may not touch the *Earth*; Or else you must vault the *Earth*, whereby it may hang ouer them, and not touch them: For if the *Earth* touch them, it will doe more hurt, by the Moisture, causing them to putrifie, than good by the virtuall Cold, to conserue them; Except the *Earth* be very Drie, and Sandie.

An *Orenge*, *Limon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Fortnightes Space, foure foot deepe within the *Earth*, though it were in a Moist Place, and a Rainie Time, yet came forth, no waies Mouldie, or Rotten, but were become a little harder than they were; Otherwise fresh in their Colour, But their Iuyce somewhat flatted. But with the *Buriall* of a Fortnight more they became putrified.

A *Bottle* of *Beere*, buried in like manner, as before, became more lively, better tasted, and Clearer, than it was. And a *Bottle* of *wine* in like manner. A *Bottle* of *Vinegar*, so buried, came forth more lively, and more Odoriferous, smelling almost like a *Violet*. And after the whole Moneths *Buriall*, all the Three came forth, as fresh and lively, if not better, than before.

It were a profitable *Experiment*, to preserue *Orenges*, *Lemons*, and *Pomgranates*, till Summer; For then their Price will bee mightily increased. This may be done, if you put them in a Pot or Vessell, well couered, that the *Moisture* of the *Earth* come not at them; Or else by putting them in a *Conservatory* of *Snow*. And generally, whosoever will make *Experiments* of Cold, let him be provided of three Things, A *Conservatorie* of *Snow*; A good large *Vault*, twenty foot at least vnder the *Ground*; And a *Deepe well*.

There hath beene a Tradition, that *Pearle*, and *Corall*, and *Turbois-Stone*, that haue lost their Colours, may be recovered by *Burying* in the *Earth*. Which is a thing of great profit, if it would sort: But vpon Triall of Six weekes *Buriall*, there followed no effect. It were good to trie it, in

Experiments
in Consort,
touching *Buriall*
alls or *Infusions*
of diuers *Bodies*
in *Earth*.

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in a *Deepe Well*, or in a *Conseruatory of Snow*, where the Cold may be more *Constringent*; And so make the *Body* more vnited, and thereby more *Resplendent*.

Experiment
Solitary tou-
ching the Af-
fects in Mens
Bodies from Se-
uerall Winds.

381

Mens Bodies are heauier, and lesse disposed to Motion, when *Southerne* winds blow, than when *Northerne*. The Cause is, for that when the *Southerne* winds blow, the Humours doe (in some Degree) melt and wax fluide, and so flow into the Parts; As it is seene in *Wood*, and other Bodies; which, when the *Southerne* winds blow, doe swell. Besides, the Motion and Actiuity of the Body consisteth chiefly in the *Sinewes*, which, when the *Southerne* wind bloweth, are more relax.

Experiment
Solitary tou-
ching *Winter*
and *Summer*
Sicknesses.

382

IT is commonly seene, that more are *Sicke* in the *Summer*, and more *Dye* in the *winter*; Except it be in *Pestilent Diseases*, which commonly reigne in *Summer*, or *Autumne*. The Reason is, because *Diseases* are bred (indeed) chiefly by *Heat*; But then they are Cured most by *Sweat*, and *Purge*; which in the *Summer* commeth on, or is prouoked, more Easily: As for *Pestilent Diseases*, the Reason why most Die of them in *Summer*, is because they are bred most in the *Summer*; For otherwise those that are touched are in most Danger in the *winter*.

Experiment
Solitary tou-
ching *Pestilen-
tiall* Seasons.

383

THe Generall Opinion is, that *Yeares Hot* and *Moist*, are most *Pestilent*; Vpon the Superficiall Ground, that *Heat* and *Moisture* cause *Putrefaction*. In *England* it is found not true; For, many times, there haue beene great *Plagues* in *Drie* Yeares. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Aires*, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Enflame: Besides, it tainteth the *waters* (commonly,) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake vp in the *Summer-moneths*, when the *weather* is *Hot* and *Dry*.

Experiment
Solitary tou-
ching an Error
received about
Epidemicall Dis-
eases.

384

MAny *Diseases*, (both *Epidemicall*, and others,) breake forth at *Particular times*. And the Cause is falsly imputed to the *Constitution* of the *Aire*, at that time, when they breake forth, or reigne; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Observations, of the *Diseases*, that ensue vpon the *Nature*, of the *Precedent foure Seasons* of the *Yeare*.

Experiment
Solitary tou-
ching the Al-
teration or Pre-
seruation of Li-
quors in Wells,
or deepe *Faults*.

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TRiall hath been made, with *Earthen Bottles* well stopped, hanged in a well of Twenty Fathome deep, at the least; And some of the *Bottles* haue beene let downe into the *Water*, some others haue hanged aboue, within about a fathome of the *water*; And the *Liquors* so tried haue beene, *Beere*, (not New, but Ready for drinking,) and *wine*, and *Milke*. The Prooffe hath beene, that both the *Beere*, and the *wine*, (as well within *Water*, as aboue,) haue not been palled or deaded at all; But

as

as good or somewhat better, than *Bottles* of the same *Drinkes*, and Stale-
ness, kept in a *Cellar*. But those which did hang above *Water*, were ap-
parently the best; And that *Beere* did flower a little, whereas that vnder
Water did not, though it were Fresh. The *Milke* sowed, and began to
Putrefie: Neuerthelesse it is true, that there is a *Village* neere *Blois*, where
in *Deepe Caves* they doe thicken *Milke*; In such sort that it becommeth
very pleasant; Which was some *Cause* of this Triall of Hanging *Milke*
in the *Well*: But our prooffe was naught: Neither doe I know, whether
that *Milke* in those *Caves*, bee first boyled. It were good therefore to try
it with *Milke* Soddens, and with *Creame*; For that *Milke* of it selfe is such
a Compound Body, of *Creame*, *Cards*, and *Whey*, as it is easily Turned,
and Dissolued. It were good also to try the *Beere*, when it is in *Wort*, that
it maybe seene, whether the *Hanging* in the *well*, will Accelerate the *Ri-
pening* and *Clarifying* of it.

Diuers, we see, doe *Stut*. The *Cause* may be, (in most,) the *Refrige-
ra-
tion* of the *Tongue*; Whereby it is lesse apt to moue. And therefore
wee see, that *Naturalls* doe generally *Stut*; And wee see that in those that
Stut, if they drinke *Wine* moderately, they *Stut* lesse, because it heateth:
And so wee see, that they that *Stut*, doe *Stut* more in the first Offer to
speake, than in Continuance; Because the *Tongue* is, by Motion, some-
what heated. In some also, it maybe, (though rarely,) the *Driness* of the
Tongue; which likewise maketh it lesse apt to moue, as well as *Cold*; For
it is an Affect that cometh to some *wise* and *Great Men*; As it did vnto
Moses, who was *Lingua prapedita*; And many *Stutters* (we finde) are very
Cholericke Men; *Choler* Enducing a *Driness* in the *Tongue*.

S*melles*, and other *Odours*, are Sweeter in the Aire, at some Distance,
than neere the *Nose*; As hath beene partly touched heretofore. The
Cause is double; First the finer Mixture, or Incorporation of the *Smell*:
For wee see that in *Sounds* likewise, they are Sweetest, when wee cannot
heare euery Part by it selfe. The other *Reason* is, for that all *Sweet Smells*
haue ioyned with them, some *Earthy* or *Crude Odours*; And at some di-
stance the *Sweet*, which is the more Spirituall, is Perceiued; And the
Earthy reacheth not so farre.

Sweet Smells are most forcible, in *Dry Substances*, when they are *Bro-
ken*; And so likewise in *Orenges*, or *Lemons*, the Nipping of their Rinde,
giueth out their *Smell* more: And generallly, when *Bodies* are *Moued* or
Stirred, though not *Broken*, they *Smell* more; As a Sweet-Bagge waued.
The *Cause* is double: The one, for that there is a *Greater Emission* of the
Spirit, when Way is made: And this holdeth in the *Breaking*, *Nipping*, or
Crushing; It holdeth also, (in some Degree) in the Mouing; But in this
last, there is a Concurrence of the Second *Cause*; Which is the *Impulsi-
on* of the *Aire*, that bringeth the *Sent* faster vpon vs.

The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaues*
smell not; As *Violets*, *Roses*, *Wall flowers*, *Gilly-flowers*, *Pinkes*, *Woodbines*,
Vine.

Experiment
Solitary tou-
ching *Stutting*.
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Experiments
in Consort,
touching *Smells*.
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Vine-flowers, Apple-Bloomes, Lime-Tree Bloomes, Beane-Bloomes, &c. The Cause is, for that where there is Heat and strength enough in the *Plant*, to make the *Leaves Odorate*, there the *Smell* of the *Flower* is rather Euanide and Weaker, than that of the *Leaves*; As it is in *Rose-mary-Flowers, Lavender-Flowers, and Sweet-Brier-Roses*. But where there is lesse Heat, there the *Spirit* of the *Plant* is digested and refined, and seuered from the grosser Juice, in the *Efflorescence*, and not before.

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Most *Odours* smell best, *Broken* or *Crushe*, as hath beene said: But *Flowers Pressed* or *Beaten*, doe leese the Freshnesse and Sweetnesse of their *Odour*. The Cause is, for that when they are *Crushed*, the Groffer and more *Earthy Spirit* commeth out with the Finer, and troubleth it; Whereas in stronger *Odours* there are no such Degrees of the Issue of the *Smell*.

Experiments
in Confort,
touching the
Goodnesse and
choise of
Water.

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IT is a thing of very good Vse, to discover the *Goodnesse* of *Waters*. The *Taste*, to those that *Drinke water* only, doth somewhat: But other *Experiments* are more sure. First, try *Waters* by *Weight*; Wherein you may find some difference, though not much: And the *Lighter* you may account the Better.

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Secondly, try them by *Boyling* vpon an *Equall Fire*: And that which consumeth away fastest, you may account the Best.

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Thirdly, try them in *Seuerall Bottles*, or *Open Vessells*, Matches in euery Thing else, and see which of them *Last Longest*, without *Stench* or *Corruption*. And that which holdeth *Vnputrified* longest, you may likewise account the Best.

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Fourthly, try them by *Making Drinckes* Stronger, or Smaller, with the same *Quantity* of *Mault*; And you may conclude, that that *water*, which maketh the *Stronger Drinke*, is the more *Concocted*, and *Nourishing*; though perhaps it bee not so good for *Medicinall Vse*. And such *water* (commonly) is the *Water* of *Large* and *Nauigable Rivers*; And likewise in *Large* and *Cleane Ponds* of *Standing-water*: For vpon both them, the *Sunne* hath more Power, than vpon *Fountaines*, or *Small Rivers*. And I conceiue that *Chalke-water* is next them the best, for going furthest in *Drinke*; For that also helpeth *Concoction*; So it bee out of a *Deepe Well*; For then it Cureth the *Rawnesse* of the *water*; But *Chalky water*, towards the *Top* of the *Earth*, is too fretting; As it appeareth in *Laundry* of *Cloathes*, which weare out apace, if you vse such *waters*.

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Fifthly, The *Honswines* doe finde a Difference in *waters*, for the *Bearing*, or *Not Bearing* of *Soape*; And it is likely that the more *Fat water* will beare *Soape* best; For the *Hungry Water* doth kill the *Vntuous Nature* of the *Soape*.

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Sixthly, you may make a Iudgement of *Waters*, according to the *Place*, whence they *Spring*, or *Come*; The *Raine-Water* is, by the *Physicians*, esteemed the *Finest*, and the best; But yet it is said to putrifie soonest; which is likely, because of the *Finenesse* of the *Spirit*: And in *Con-*

seruatorie:

seruatories of Raine-water, (such as they haue in *Venice*, &c.) they are found not so Choice *Waters*; The worse, (perhaps,) because they are Couered aloft, and kept from the Sunne. *Snow water* is held vnwholesome; In so much as the People, that dwell at the Foot of the *Snow-Mountaines*, or otherwise vpon the Ascent (especially the Women) by drinking of *Snow-water*, haue great Bags hanging vnder their Throats. *well-water*, except it be vpon *Chalke*, or a very plentiful Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High-Hills* are the best; For both they seeme to haue a Lightnesse, and Appetite of Mounting; And besides they are most pure and Vnmingled; And againe are more Percolated thorow a great Space of Earth. For *Waters* in *Valleys*, ioine in effect vnder ground with all *waters* of the same Leuell; Whereas *Springs*, on the *Tops* of *Hills*, passe thorow a great deale of Pure *Earth*, with lesse Mixture of other *waters*.

Seuenthly, Iudgement may bee made of *Waters*, by the *Soyle* whereupon the water runneth; As *Pebble* is the Cleanest, and best tasted; And next to that *Clay water*; And Thirdly, *Water* vpon *Chalke*; Fourthly, that vpon *Sand*; And Worst of all vpon *Mud*. Neither may you trust *waters* that Taste Sweet; For they are commonly found in Rising Grounds of great *Cities*; which must needs take in a great deale of Filth.

IN *Pern*, and diuers Parts of the *west-Indies*, though vnder the *Line*, the *Heats* are not so Intolerable, as they bee in *Barbary*, and the *Skirts* of the *Torrid Zone*. The *Causes* are, First the Great *Brizes*, which the Motion of the Aire in great Circles, (such as are vnder the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in those Parts Noone is nothing so hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cause* is, for that the Length of the Night, and the Dewes thereof, doe compensate the *Heat* of the Day. A third *Cause* is the Stay of the Sunne; Not in Respect of Day and Night, (for that wee spake of before,) but in Respect of the *Season*; For vnder the *Line*, the Sunne crosseth the *Line*, and maketh two Summers, and two Winters; But in the *Skirts* of the *Torrid Zone*, it doubleth and goeth backe againe, and so maketh one Long Summer.

THE *Heat* of the *Sunne* maketh *Men Blacke* in some Countries, as in *Ethiopia*, and *Ginny*, &c. *Fire* doth it not, as wee see in *Glassemen*, that are continually about the *Fire*. The *Reason* may bee, because *Fire* doth lick vp the *Spirits*, and *Bloud* of the Body, so as they Exhale; So that it euer maketh *Men* looke Pale, and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the *Bloud* to the Outward *Parts*: And rather Concocteth it, than Soaketh it: And therefore wee see that all *Ethiopes* are Flethy, and Plumpe, and haue great Lips; All which betoken *Moisture* retained, and not drawne out. Wee see also, that the

K

Negroes

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Experiment
Solitary touching the
Temperate Heat vnder the
Equinoctiall.

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Experiment
Solitary touching the
Coloration of Blacke
and Tawney
Mooues.

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Negroes are bred in Countries that haue Plenty of *water*, by *Riuers* or otherwise: For *Meroë*, which was the *Metropolis* of *Ethiopia*, was vpon a great Lake: And *Congo*, where the *Negroes* are, is full of *Riuers*. And the *Confines* of the *Riuer Niger*, where the *Negroes* also are, are well watered: And the Region about *Capo Verde*, is likewise Moist, in so much as it is pe-tilent through Moisture: But the Countries of the *Abyssenes*, and *Barbarry*, and *Pera*, where they are Tawney, and Oliuaster, and Pale, are generally more Sandy and Dry. As for the *Ethiopes*, as they are Plumpe, and Fleihv; So (it may bee) they are Sanguine, and ruddy Coloured, if their blacke Skin would suffer it to be seene.

Experiment
Solitary tou-
ching Motion
after the In-
stant of Death.

400

SOME *Creatures* doe moue a good while after their head is off; As *Birds*; Some a very little time; As *Men*, and all beasts: Some moue, though cut in seuerall Peeces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. First therefore it is certaine, that the *Immediate Cause* of *Death*, is the Resolution, or Extinguishment of the *Spirits*; And that the Destruction or Corruption of the *Organs*, is but the *Mediate Cause*. But some *Organs* are so peremptorily necessary, that the Extinguishment of the *Spirits* doth speedily follow; But yet so, as there is an *Interim* of a small Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beast* hath lowed, after the Heart hath beene seuered; And it is a report also of Credit, that the Head of a *Pig* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or seuering it from the Marrow of the Backe-bone; During which time the *Pig* hath beene, in all appearance, starke dead, and without Motion; And after a small time the Braine hath beene replaced, and the Skull of the *Pig* closed, and the *Pig* hath a little after gone about. And certaine it is, that an *Eye* vpon *Reuenge* hath beene thrust forth, so as it hanged a pretty distance by the *Visuall Nerue*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recovered *Sight*. Now the *Spirits* are chiefly in the *Head* and *Cells* of the *Braine*, which in *Men*, and *Beasts* are Large; And therefore when the *Head* is off, they moue little or Nothing. But *Birds* haue small *Heads*, and therefore the *Spirits* are a little more dispersed in the *Sinewes*, whereby Motion remaineth in them a little longer; In so much as it is Extant in Story, that an *Emperour* of *Rome*, to shew the Certainty of his Hand, did shoot a great Forked Arrow at an *Estrich*, as she ranne swiftly vpon the Stage, and strooke off her Head; And yet she continued the Race, a little way, with the Head off. As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffused almost all ouer; And therefore they moue in their Seuerall Peeces.

NATV-



NATVRALL HISTORIE.

V. Century.



WE will now enquire of *Plants* or *Vegetables* : And wee shall doe it with diligence. They are the Principall Part of the *Third Dayes Worke*. They are the first *Producat*, which is the Word of *Animation* : For the other Words are but the Words of *Essence* ; And they are of excellent and generall Vse, for Food, Medicine, and a Number of Mechanicall Arts.

There was sowne in a *Bed*, *Turnip-Seed*, *Radish-Seed*, *wheat*, *Cucumber-Seed*, and *Pease*. The *Bed* wee call a *Hot-Bed*, and the Manner of it is this. There was taken *Horse-Dung*, old, and well rotted ; This was laid vpon a Banke, halfe a foot high, and supported round about with Plankes ; And vpon the Top was cast Sifted Earth, some two Fingers deepe ; And then the *Seed* sprinkled vpon it, hauing beene steeped all night in *water*, Mixed with *Cow-dung*. The *Turnip-Seed*, and the *wheat* came vp halfe an Inch aboute Ground, within two dayes after, without any Watring. The Rest the third day. The *Experiment* was made in *October* ; And (it may bee) in the *Spring*, the *Accelerating* would haue beene the speedier. This is a Noble *Experiment* ; For without this helpe, they would haue

Experiments
in Consort,
touching the
Acceleration of
Germination.

beene foure times as long in coming vp. But there doth not occur to me, at this present, any vse thereof, for profit; Except it should be for Sowing of *Pease*; which haue their Price very much increased, by the early Comming. It may bee tried also with *Cherries*, *Straw-berries*, and other Fruit, which are dearest, when they come early.

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There was *wheat* steeped in *Water* mixed with *Cow-dung*; Other in *Water* mixed with *Horse-dung*; Other in *Water* mixed with *Pigeon-dung*; Other in *Urine* of *Man*; Other in *Water* mixed with *Chalke* powdered; Other in *Water* mixed with *Soot*; Other in *Water* mixed with *Asbes*; Other in *Water* mixed with *Bay-Salt*; Other in *Claret Wine*; Other in *Malmsey*; Other in *Spirit* of *Wine*. The Proportion of the Mixture was a fourth Part of the Ingredients to the *Water*; Saue that there was not of the *Salt* above an eighth Part. The *Urine*, and *wines*, and *Spirit* of *Wine*, were Simple without Mixture of *Water*. The Time of the Steeping was twelue houres. The Time of the Yeere *October*. There was also other *wheat* sowne *unsteeped*, but *watred* twice a day with *Warmewater*. There was also other *Wheat* sowne *Simple* to compare it with the rest. The Euent was; That those that were in the Mixture of *Dung*, and *Urine*, and *Soot*, *Chalke*, *Asbes*, and *Salt*, came vp within six dayes: And those that afterwards proued the Highest, Thickest, and most Lusty, were; First, the *Urine*; And then the *Dungs*; Next the *Chalke*, Next the *Soot*; Next the *Asbes*; Next the *Salt*; Next the *wheat* Simple of it selfe, vnsteeped, and vnwatred; Next the *Watred* twice a day with warme water; Next the *Claret wine*. So that these three last were slower than the ordinary *wheat* of it selfe; And this Culture did rather retard, than aduance. As for those that were steeped in *Malmsey*, and *Spirit* of *Wine*, they came not vp at all. This is a Rich Experiment for Profit: For the most of the Steepings are Cheape Things; And the Goodnesse of the Crop is a great Matter of Gaine; If the Goodnesse of the Crop answer the Earlinesse of the Comming vp: As it is like it will; Both being from the vigour of the *Seed*; Which also partly appeared in the Former Experiments, as hath beene said. This Experiment would bee tried in other *Graines*, *Seeds*, and *Kernels*: For it may bee some Steeping will agree best with some *Seeds*. It would bee tried also with *Roots* steeped as before, but for *Longer Time*. It would bee tried also in *Seuerall Seasons* of the Yeere, especially the *Spring*.

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Straw-berries watred now and then (as once in three dayes) with *Water*, wherein hath beene steeped *Sheeps-dung*, or *Pigeon-dung*, will preuent and come early. And it is like, the same Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Graines*, or *Trees*. And therefore it is an Experiment, though vulgar in *Straw-berries*, yet not brought into vse generally: For it is vsuall to helpe the Ground with Mucke; And likewise to Recomfort it sometimes with Mucke put to the *Roots*; But to water it with *Muckewater*, which is like to bee more Forcible, is not practised.

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Dung, or *Chalke*, or *Blond*, applied in Substance, (seasonably) to the *Roots*

Roots of Trees, doth set them forwards. But to doe it vnto *Herbs*, without Mixture of *Water* or *Earth*, it may bee these Helpe are too Hot.

The former *Meanes* of Helping *Germination*, are either by the *Goodnesse* and *Strength* of the *Nourishment*; Or by the *Comforting*, and *Exciting* the *Spirits* in the *Plant*, to draw the *Nourishment* better. And of this latter kinde, concerning the *Comforting* of the *Spirits* of the *Plant*, are also the Experiments that follow; Though they bee not Applications to the *Root*, or *Seed*. The *Planting* of *Trees* warme vpon a *wall*, against the South, or South-East Sunne, doth hasten their *Commings on*, and *Ripening*; And the South-East is found to bee better than the South-West, though the South-West bee the Hotter Coast. But the cause is chiefly, for that the Heat of the Morning succeedeth the Cold of the Night: and partly, because (many times) the South-West Sunne is too Parching. So likewise the *Planting* of them vpon the *Backe* of a *Chimney*, where a *Fire* is kept, doth hasten their *Commings on*, and *Ripening*: Nay more, the *Drawing* of the *Boughes* into the *Inside* of a *Roome*, where a *Fire* is continually kept, worketh the same Effect: Which hath been tried with *Grapes*; In so much as they will come a Moneth earlier, than the *Grapes* abroad.

Besides the two *Meanes* of *Accelerating Germination*, formerly described; That is to say, the *Mending* of the *Nourishment*; and *Comforting* of the *Spirit* of the *Plant*; there is a Third; Which is the *Making way* for the *Easie Comming* to the *Nourishment*, and *Drawing* it. And therefore *Gentle Digging* and *Loosening* of the *Earth* about the *Roots* of *Trees*; And the *Remouing Herbs* and *Flowers* into new *Earth*, once in two yeares, (which is the same thing; For the new *Earth* is euer looser) doth greatly further the *Prospering*, and *Earlinesse* of *Plants*.

But the most admirable *Acceleration* by *Facilitating* the *Nourishment*, is that of *Water*. For a *Standard* of a *Damaske Rose* with the *Root* on, was set in a *Chamber*, where no *Fire* was, vpright in an *Earthen Panne*, full of *faire water*, without any Mixture; halfe a foot vnder the *Water*; the *Standard* being more than two foot high above the *water*. Within the Space of ten dayes, the *Standard* did put forth a faire Greene Leaf, and some other little Buds, which stood at a stay, without any Shew of decay or withering, more than seven Dayes. But afterwards that Leaf faded, but the young Buds did sprout on; which afterward opened into faire Leaues, in the space of three Moneths; And continued so a while after, till vpon Remouall wee left the *Triall*. But note that the *Leaues* were somewhat paler, and lighter coloured, than the *Leaues* vsd to bee abroad. Note that the first *Buds* were in the End of *October*; And it is likely that if it had beene in the *Spring* time, it would haue put forth with greater strength, and (it may bee) to haue growne on to beare *Flowers*. By this *Meanes*, you may haue (as it seemeth) *Roses* set in the middest of a *Poole*, being supported with some stay; Which is Matter of Rarenesse and Pleasure, though of small Vse. This is the more

strange, for that the like *Rose-standard* was put, at the same time, into *Water* mixed with *Horse-dung*, the *Horse-dung* about the fourth Part to the *Water*, and in foure Moneths space (while it was obserued) put not forth any *Leafe*; though diuers *Buds* at the first, as the other.

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A *Dutch Flower*, that had a *Bulbous Root*, was likewise put at the same time, all vnder *Water*, some two or three Fingers deepe; And within seuen dayes sprouted, and continued long after, further Growing. There were also put in, a *Beet-Root*, a *Borage-Root*, and a *Raddish Root*, which had all their *Leaves* cut almost close to the *Roots*; And within six weekes had faire *Leaves*; And so continued till the end of *November*.

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Note, that if *Roots*, or *Pease*, or *Flowers*, may bee *Accelerated* in their *Comming* and *Ripening*, there is a double Profit; The one in the high *Price* that those Things beare when they come early: The other in the *Swiftnesse* of their *Returns*: For in some *Grounds* which are strong, you shall haue a *Raddish*, &c. come in a Moneth; That in other *Grounds* will not come in two; And so make double *Returns*.

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Wheat also was put into the *Water*, and came not forth at all; So as it seemeth there must bee some *Strength* and *Bulke* in the *Body*, put into the *Water*, as it is in *Roots*; For *Graines* or *Seeds*, the *Cold* of the *Water* will mortifie. But casually some *Wheat* lay vnder the *Pan*, which was somewhat moistened by the *Suing* of the *Pan*; which in six weekes (as afore said) looked mouldy to the *Eye*, but it was sprouted forth halfe a fingers length.

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It seemeth by these *Instances* of *Water*, that for *Nourishment*, the *Water* is almost all in all, and that the *Earth* doth but keepe the *Plant* ypright, and saue it from *Over-heat*, and *Over-cold*; And therefore is a *Comfortable Experiment* for good *Drinkers*. It proueth also that our former *Opinion*; That *Drinke* incorporate with *Flesh*, or *Roots*, (as in *Capon-Beere*, &c.) will nourish more easily, than *Meat* and *Drinke* taken seuerally.

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The *Housing* of *Plants* (I conceiue) will both *Accelerate* *Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seasons*: And as wee *House* *Hot-Country Plants*, as *Lemons*, *Orenges*, *Myrtles*, to saue them; So wee may *House* our owne *Country Plants*, to forward them, and make them come in the *Cold Seasons*; In such sort, that you may haue *Violets*, *straw-berries*, *Pease*, all *Winter*. So that you sow, or remoue them at fit times. This *Experiment* is to bee referred vnto the *Comforting* of the *Spirit* of the *Plant*, by *warmth*, as well as *Housing* their *Boughes*, &c. So then the *Meanes*, to *Accelerate* *Germination*, are in *Particular* eight, in *Generall* three.

Experiments
in Consort,
touching the
Putting backe or
Retardation of
Germination.

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TO make *Roses*, or other *Flowers* come late, it is an *Experiment* of *Pleasure*. For the *Ancients* esteemed much of *Rosa Sera*. And indeed the *November-Rose* is the sweetest, hauing beene lesse exhale by the *Sunne*. The *Meanes* are these. First, the *Cutting off* their *Tops*, immediately after they haue done *Bearing*; And then they will come againe the

the same yeare about *November* : But they will not come iust on the Tops, where they were cut, but out of those Shoots, which were (as it were,) *Water-Boughes*. The *Cause* is, for that the Sap, which otherwise would haue fed the Top, though after Bearing,) will, by the discharge of that, diuert vnto the Side-Sprouts ; And they will come to beare, but later.

The Second is the *Pulling off the Buds of the Rose*, when they are *Newly knotted* ; For then the Side-Branches will beare. The *Cause* is the same with the former : For *Cutting off the Tops*, and *Pulling off the Buds*, worke the same Effect, in Retention of the Sap for a time, and Diuersion of it to the Sprouts, that were not so forward.

The Third is the *Cutting off some few of the Top-boughes* in the *Spring-time*, but suffering the lower Boughes to grow on. The *Cause* is, for that the Boughes doe helpe to draw vp the Sap more strongly ; And wee see that in Powling of Trees, many doe vse to leaue a Bough or two on the Top, to helpe to draw vp the Sap. And it is reported also, that if you graft vpon the Bough of a Tree, and cut off some of the old Boughes, the new Cions will perish.

The Fourth is by *Laying the Roots bare about Christmas*, some dayes. The *Cause* is plaine, for that it doth arrest the Sappe, from going vpwards, for a time ; Which Arrest is afterwards released by the Couering of the Root againe with Earth ; And then the Sap getteth vp, but later.

The Fifth is the *Remouing of the Tree*, some Moneth before it *Buddeth*. The *Cause* is, for that some time will bee required after the *Remoue*, for the Reserling, before it can draw the Iuyce : And that time being lost, the Blossome must needs come forth later.

The Sixth is the *Grafting of Roses in May*, which commonly Gardiners doe not till *July* ; And then they beare not till the Next Yeare ; But if you graft them in *May*, they will beare the same yeare, but late.

The Seuen is, the *Girding of the Body of the Tree* about with some Packe-threed ; For that also, in a degree, restraineth the Sap, and maketh it come vp, more late, and more Slowly.

The Eighth is, the *Planting of them in a Shade*, or in a *Hedge* ; The *Cause* is, partly the Keeping out of the Sunne, which hasteneth the Sap to rise ; And partly the Robbing of them of Nourishment, by the Stufte in the Hedge. These Meanes may bee practised vpon other, both Trees, and Flowers, *Mutatis Mutandis*.

Men haue entertained a Conceit that sheweth perrily ; Namely, that if you graft a *Late-Coming Fruit*, vpon a Stocke of a *Fruit-tree*, that *Commeth early*, the Graft will beare *Fruit early* ; As a Peach vpon a Cherry ; And contrariwise, if an *Early-Coming-Fruit* vpon a Stocke of a *Fruit-tree* that *Commeth late*, the Graft will beare *Fruit late* ; As a Cherry vpon a Peach. But these are but Imaginations, and vntrue. The *Cause* is, for that the Cions ouer-ruleth the Stocke quite ; And the Stocke is but Passive onely, and giueth Aliment, but no Motion to the Graft.

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Experiments
in Consort,
touching the
Melioration of
Fruits, Trees,
and Plants.

Wee will speake now, how to make *Fruits, Flowers, and Roots* larger; in more plenty; and sweeter; than they vse to bee; And how to make the *Trees* themselves, more tall; more Spread; and more Hastic and Sudden; than they vse to be. Wherein there is no doubt, but the former *Experiments* of *Acceleration*, will serue much to these purposes. And againe, that these *Experiments*, which wee shall now set downe, doe serue also for *Acceleration*; because both Effects proceed from the Encrease of Vigour in the Tree: But yet to auoid Confusion; And because some of the Meanes are more proper for the one Effect, and some for the other, wee will handle them apart.

422 It is an assured Experience, that an *Heap of Flint, or Stone*, laid about the *Bottom* of a *wilde-Tree*, (as an *Oake, Elme, Ash, &c.*) vpon the first Planting, doth make it prosper double as much, as without it. The Cause is, for that it retaineth the Moisture, which falleth at any time vpon the Tree, and suffereth it not to bee exhaled by the Sunne. Again, it keepeth the Tree warme, from Cold Blasts and Frosts, as it were in an House. It may be also, there is somewhat in the Keeping of it steady at the first. *Quare*, if Laying of Straw some Height about the Body of a Tree, will not make the Tree forwards. For though the Root giueth the Sap, yet it is the Body that draweth it. But you must note, that if you lay *Stones* about the stalke of Lettuce, or other Plants, that are more soft, it will ouer-moisten the Roots, so as the Wormes will eat them.

423 A Tree, at the first *Setting*, should not bee *Shaken*, vntill it hath taken Root fully: And therefore some haue put two little Forkes about the Bottom of their Trees, to keepe them vpright; But after a yeares Rooting, then Shaking doth the Tree good, by Loosening of the Earth, and (perhaps) by Exercising (as it were) and Stirring the Sap of the Tree.

424 Generally, the *Cutting away* of *Boughes* and *Suckers* at the Root and Body, doth make Trees grow high; And contrariwise, the *Howling* and *Cutting* of the Top, maketh them grow spread, and Bushy. As we see in *Pollards, &c.*

425 It is reported, that to make *hasty Growing Coppice Woods*, the way is, to take *Willow, Sallow, Poplar, Alder*; of some seuen yeares growth; And to set them, not vpright, but a slope, a reasonable depth vnder the Ground; And then, instead of one Root, they will put forth many, and so carry more Shoots vpon a Stemme.

426 When you would haue many new Roots of *Fruit-Trees*, take a *Low Tree*, and bow it, and lay all his branches a flat vpon the Ground, and cast Earth vpon them; And euery Twigge will take Root. And this is a very profitable *Experiment* for *Costly Trees*; (for the Boughes will make

Stockes

Stockes without charge;) Such as are *Apricots, Peaches, Almonds, Cornelians, Mulberries, Figs, &c.* The like is continually practised with *Vines, Roses, Muske-Roses, &c.*

From *May to Iuly* you may take off the *Barke* of any *Bough*, being of the *Bignesse* of three or foure Inches, and couer the bare Place, somewhat aboue, and below, with *Loame* well tempered with *Horse-dung*, binding it fast downe. Then cut off the *Bough* about *Albiontide* in the bare place, and set it in the *Ground*; And it will grow to be a faire *Tree* in one *Yeare*. The *Cause* may be, for that the *Baring* from the *Barke* keepeth the *Sap* from descending towards *Winter*, and so holdeth it in the *Bough*; And it may be also that the *Loame* and *Horse-Dung* applied to the bare place, doe moisten it, and cherish it, and make it more apt to put forth the *Root*. Note, that this may be a generall Meanes for keeping vp the *Sap* of *Trees* in their *Boughes*; Which may serue to other Effects.

It hath beene practised in *Trees*, that shew faire, and beare not, to Bore a *Hole* thorow the *Heart* of the *Tree*, and thereupon it will beare. Which may be for that the *Tree* before had too much *Repletion*, and was oppressed with his owne *Sap*, for *Repletion* is an *Enemie* to *Generation*.

It hath beene practised in *Trees*, that doe not beare, to cleaue two or three of the *Chiefe* *Roots*, and to put into the *Cleft* a small *Pebble*, which may keepe it open, and then it will beare. The *Cause* may be, for that a *Root* of a *Tree* may be (as it were,) *Hide-bound*, no lesse than the *Body* of the *Tree*; But it will not keepe open without somewhat put into it.

It is vsually practised, to set *Trees* that require much *Sunne*, vpon *walls* against the *South*; As *Apricots, Peaches, Plums, Vines, Figs*, and the like. It hath a double *Commodity*; The one, the *Heat* of the *wall* by *Reflection*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the vpper *Boughes* ouer-shadow the lower; But when it is spread vpon a *Wall*, the *Sunne* commeth alike, vpon the vpper, and lower *Branches*.

It hath also beene practised (by some) to pull off some *Leaves* from the *Trees* so spread, that the *Sunne* may come vpon the *Bough* and *Fruit* the better. There hath beene practised also a *Curiosity*, to set a *Tree* vpon the *North-Side* of a *Wall*, and at a little height, to draw him thorow the *Wall*, and spread him vpon the *South-Side*: Conceiuing that the *Root* and lower Part of the *Stocke* should enioy the freshnesse of the *Shade*; And the Vpper *Boughes*, and *Fruit*, the *Comfort* of the *Sunne*. But it sorted not; The *Cause* is, for that the *Root* requireth some *Comfort* from the *Sunne*, though vnder *Earth*, as well as the *Body*: And the Lower Part of the *Body* more than the Vpper, as wee see in *Compassing* a *Tree* below with *Straw*.

The *Lownesse* of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better; For you shall euer see in *Apricots, Peaches,*

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Peaches, or *Melo-Cotones*, vpon a wall, the greatest Fruits towards the Bottome. And in *France* the *Grapes* that make the *Wine*, grow vpon low Vines, bound to small Stakes. And the raised Vines in Arbours make but Veriuyce. It is true, that in *Italy*, and other *Countries*, where they haue hotter Sunne, they raise them vpon *Elmes*, and *Trees*; But I conceiue, that if the *French* Manner of Planting low, were brought in vse there, their *Wines* would be stronger and sweeter. But it is more chargeable in respect of the Props. It were good to trie whether a *Tree* grafted somewhat neare the Ground, and the lower boughes only maintained, and the higher continually pruned off, would not make a larger Fruit.

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To haue Fruit in Greater Plenty, the way is, to graft, not onely vpon young *Stocks*, but vpon diuers *Boughes* of an old *Tree*; for they will beare great Numbers of Fruit; Whereas if you graft but vpon one Stocke, the *Tree* can beare but few.

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The Digging yearly about the *Roots* of *Trees*, which is a great means, both to the Acceleration and Melioration of Fruits, is practised in nothing but in *Vines*; Which if it were transferred vnto other *Trees*, and *Shrubs*, (as *Roses*, &c.) I conceiue would aduance them likewise.

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It hath beene knowne, that a *Fruit-Tree* hath beene blowne vp (almost) by the *Roots*, and set vp againe, and the next yeare bare exceedingly. The Cause of this, was nothing but the Loosening of the Earth, which comforteth any *Tree*; and is fit to be practised, more than it is, in *Fruit-Trees*: For *Trees* cannot be so fitly remoued into New Grounds, as *Flowers* and *Herbs* may.

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To reuiue an Old *Tree*, the Digging of it about the *Roots*, and Applying new Mould to the *Roots*, is the way. We see also that *Draught-Oxen*, put into fresh Pasture, gather new and tender Flesh: And in all Things, better nourishment than hath beene vsed, doth helpe to renew; Especially, if it be not onely better, but changed, and differing from the former.

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If an *Herbe* be cut off from the *Roots*, in the beginning of Winter, and then the Earth be trodden and beaten downe hard, with the Foot and Spade, the *Roots* will become of very great Magnitude in Summer. The Reason is, for that the Moisture being forbidden to come vp in the Plant, stayeth longer in the Root, and so dilareth it. And *Gardiners* vse to tread downe any loose Ground, after they haue sowne *Onions*, or *Turnips*, &c.

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If *Panicum* be laid below, and about the Bottome of a *Root*, it will cause the Root to grow to an Excessiue Bignesse. The Cause is, for that being it selfe of a Spungy Substance, it draweth the Moisture of the Earth to it, and so feedeth the Root. This is of greatest vse for *Onions*, *Turnips*, *Parsnips*, and *Carrets*.

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The Shifting of Ground is a Meanes to better the *Tree*, and Fruit; But with this Caution; That all Things do prosper best, when they are aduanced to the better: Your *Nursery* of *Stocks* ought to be in a more

Barren

Barren Ground, than the Ground is whereunto you remove them. So all *Grassiers* preferre their Cattell from meaner Pastures to better. We see also, that Hardnesse in Youth lengthneth Life, because it leaueth a Cherishing to the better of the Bodie, in Age: Nay in Exercises, it is good to beginne with the hardest, as Dancing in Thicke Shooes, &c.

It hath beene obserued, that *Hacking of Trees* in their *Barke*, both downe-right, and acrosse, so as you make them rather in slices, than in continued Hackes, doth great good to *Trees*; And especially deliuereth them from being *Hide-bound*, and killeth their *Mosse*.

Shade to some *Plants* conduceth to make them large, and prosperous, more than *Sunne*; As in *Strawberries*, and *Bayes*, &c. Therefore amongst *Strawberries*, sow here and there some *Borage-Seed*; And you shall finde the *Strawberries* vnder those *Leaues* farre more large than their Fellowes. And *Bayes* you must plant to the *North*; Or defend them from the *Sunne* by a *Hedge-Row*; And when you sow the *Berries*, weed not the *Borders*, for the first halfe yeare; For the weed giueth them *Shade*.

To increase the *Crops of Plants*, there would be considered, not only the *Increasing* the *Lust* of the *Earth*, or of the *Plant*, but the sauing also of that which is spilt. So they haue lately made a *Triall*, to *Set wheat*, which neuertheless hath beene left off, because of the trouble and paines; Yet so much is true, that there is much saued by the *Setting*, in comparison of that which is *Sown*; Both by keeping it from being picked vp by *Birds*; And by Auoiding the *Shallow* lying of it, whereby much that is *sown* taketh no *Root*.

It is prescribed by some of the *Ancients*, that you take *Small Trees*; vpon which *Figs* or other *Fruit* grow, being yet vnripe; and couer the *Trees* in the *Middle of Autumne* with dung, vntill the *Spring*; And then take them vp in a warme day, and replant them in good ground; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth; when other *Trees* of the same kind, doe but blossome. But this seemeth to haue no great *Pobability*.

It is reported, that if you take *Nitre*, and mingle it with *water*, to the thicknesse of *Honey*, and therewith annoint the *Bud*, after the *Vine* is cut, it will sprout forth within eight dayes. The *Cause* is like to be, (if the *Experiment* be true,) the *Opening* of the *Bud*, and of the *Parts Contiguous*, by the *Spirit* of the *Nitre*; For *Nitre* is (as it were) the *Life of Vegetables*.

Take *Seed*, or *Kernels* of *Apples*, *Peares*, *Orenges*; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*;) and they will come vp much earlier than in the *Earth* it selfe. This I conceiue to bee as a *Kinde of Grafting* in the *Root*; For as the *Stocke* of a *Graft* yeeldeth better prepared nourishment to the *Graft*, than the *Crude Earth*; So the *Squill* doth the like to the *Seed*. And I suppose the same would be done, by Putting *Kernels* into a *Turnip*, or the

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the like; Saue that the *Squill* is more Vigorous and Hot. It may be tried also, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in feuerall places, when it is almost at his *Bignesse*, and before it ripeneth, hath beene practised with successe, to ripen the *Fruit* more suddenly. Wee see the Example of the *Biting* of *Wasps*, or *wormes*, vpon *Fruit*, whereby it (manifestly) ripeneth the sooner.

447 It is reported, that *Alga Marina* (*Sea-weed*) put vnder the *Roots* of *Coleworts*, and (perhaps) of other *Plants*, will further their *Growth*. The vertue (no doubt) hath Relation to *salt*, which is a great Helpe to *Fertility*.

448 It hath beene practised, to cut off the *Stalkes* of *Cucumbers*, immediately after their *Bearing*, close by the *Earth*; And then to cast a prettie *Quantity* of *Earth* vpon the *Plant* that remaineth; and they will beare the next yeare *Fruit*, long before the ordinary time. The *Cause* may be, for that the *Sap* goeth downe the sooner, and is not spent in the *Stalke* or *Leafe*, which remaineth after the *Fruit*. Where note, that the *Dying*, in the *Winter*, of the *Roots* of *Plants*, that are *Annually*, seemeth to bee partly caused by the *Over-Expence* of the *Sap* into *Stalke* and *Leaues*; which being preuented, they will super-annate, if they stand warme.

449 The *Pulling off* many of the *Blossomes* from a *Fruit-Tree*, doth make the *Fruit* fairer. The *Cause* is manifest; For that the *Sap* hath the lesse to nourish. And it is a *Common Experience*, that if you doe not pull off some *Blossomes*, the first time a *Tree* bloometh, it will blossome it selfe to death.

450 It were good to try, what would be the Effect, if all the *Blossomes* were pulled from a *Fruit-Tree*; Or the *Acornes* and *Chestnut-buds*, &c. from a *wilde Tree*, for two yeares together. I suppose that the *Tree* will either put forth the third yeare, bigger, and more plentifull *Fruit*; Or else the same yeares, larger *Leaues*, because of the *Sap* stored vp.

451 It hath beene generally receiued, that a *Plant* watered with warme water, will come vp sooner and better, than with Cold Water, or with Showres. But our *Experiment* of watering wheat with warme water (as hath beene said) succeeded not; which may be, because the Tryall was too late in the Yeare, viz. in the End of *October*. For the Cold then comming vpon the *Seed*, after it was made more tender by the Warme Water, might checke it.

452 There is no doubt, but that *Grafting* (for the most Part) doth meliorate the *Fruit*. The *Cause* is manifest; For that the Nourishment is better prepared in the *Stocke*, than in the *Crude Earth*: But yet note well, that there be some *Trees*, that are said to come vp more happily from the *Kernell*, than from the *Graft*; As the *Peach*, and *Melocotone*. The *Cause* I suppose to be, for that those *Plants* require a Nourishment of great Moisture; And though the Nourishment of the *Stocke* be finer, and

and better prepared, yet it is not so moist, and plentifull, as the Nourishment of the *Earth*. And indeed we see those *Fruits* are very cold *Fruits* in their Nature.

It hath beene receiued, that a Smaller *Peare*, grafted vpon a *Stocke* that beareth a greater *Peare*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* vpon the *Late Stocke*; And *conuerso*; which wee reiected before: For the *Cions* will gouerne. Neuerthelesse it is probable enough, that if you can get a *Cions* to grow vpon a *Stocke* of another kinde, that is much moister than his owne *Stocke*, it may make the *Fruit* Greater, because it will yeeld more plentifull Nourishment; Though it is like it will make the *Fruit* Baser. But generally, the *Grafting* is vpon a dryer *Stocke*; As the *Apple* vpon a *Crab*; The *Peare* vpon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* vpon the *Stocks* of a *Cole-wort*, and it will beare a great flaggy *Apple*; The *Kernell* of which, if it be set, will be a *Cole-wort*, and not an *Apple*. It were good to try, whether an *Apple-Cions* will prosper, if it be grafted vpon a *Sallow*, or vpon a *Poplar*, or vpon an *Alder*, or vpon an *Elme*, or vpon an *Horse-Plumme*, which are the moistest of *Trees*. I haue heard that it hath beene tried vpon an *Elme*, and succeeded.

It is manifest by Experience, that *Flowers* Remoued wax greater, because the Nourishment is more easily come by, in the loose *Earth*. It may bee, that Oft Regrafting of the same *Cions*, may likewise make *Fruit* greater; As if you take a *Cions*, and graft it vpon a *Stocke* the first yeare; And then cut it off, and graft it vpon another *Stocke* the second yeare; and so for a third; Or fourth yeare; And then let it rest, it will yeeld afterward, when it beareth, the greater *Fruit*.

Of Grafting there are many Experiments worth the Noting, but those wee reserve to a proper Place.

It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth *Leaves*, haue his *Top* cut off. The cause is plaine, for that the *Sap* hath the lesse to feed, and the lesse way to mount: But it may bee, the *Fig* will come somewhat later, as was formerly touched. The same may bee tried likewise in other *Trees*.

It is reported, that *Mulberries* will bee fairer, and the *Trees* more fruitfull, if you bore the *Trunk* of the *Tree* thorow, in seuerall places, and thrust into the Places bored, Wedges of some Hot *Trees*, as *Turpentine*, *Mastick-Tree*, *Guaiaicum*, *Iuniper*, &c. The Cause may be, for that Aduentine Heat doth cheare vp the Native Iuyce of the *Tree*.

It is reported, that *Trees* will grow greater, and beare better *Fruit*, if you put *Salt*, or *Lees of wine*, or *Blond* to the *Root*. The Cause may bee the Encreasing the Lust or Spirit of the *Root*; These Things being more forcible, than ordinary *Composts*.

It is reported by one of the Ancients, that *Artichoakes* will bee lesse prickly, and more tender, if the *Seeds* haue their *Tops* dulled, or grated off vpon a *Stone*.

459 *Herbs* will bee tenderer, and fairer ; if you take them out of *Beds*, when they are newly come vp, and remoue them into *Pots*, with better *Earth*. The Remoue from *Bed* to *Bed* was spoken of before ; But that was in severall yeares ; This is vpon the sudden. The *Cause* is the same with other *Remoues*, formerly mentioned.

460 *Cole-worts* are reported by one of the *Ancients*, to prosper exceedingly, and to be better tasted, if they be sometimes watred with *Salt water* ; And much more with *Water* mixed with *Nitre* ; The Spirit of which is lesse *Adurent* than *Salt*.

461 It is reported that *Cucumbers* will proue more Tender, and Dainty, if their *Seeds* be *Steeped* (a little) in *Milke* ; The *Cause* may bee, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the grosser Iuyce of the *Earth*, but onely the finer. The same *Experiment* may bee made in *Artichoakes*, and other *Seeds*, when you would take away, either their *Flashinesse*, or *Bitternesse*. They speake also, that the like Effect followeth, of *Steeping* in *Water* mixed with *Honey* ; But that seemeth to me not so probable, because *Honey* hath too quicke a Spirit.

462 It is reported that *Cucumbers* will bee lesse *Watry*, and more *Melon-like*, if in the Pit where you set them, you fill it (halfe way vp) with *Chaffe*, or small *Sticks*, and then powre *Earth* vpon them ; For *Cucumbers*, as it seemeth, doe extremely affect *Moisture* ; And ouer-drinke themselves ; which this *Chaffe*, or *Chips*, forbiddeth. Nay, it is further reported, that if when a *Cucumber* is growne, you set a Pot of water about fve or six inches distance from it, it will, in 24. houres, shoot so much out, as to touch the Pot ; Which if it bee true, it is an *Experiment* of an higher Nature, than belongeth to this *Title* : For it discovereth *Perception* in *Plants*, to moue towards that which should helpe and comfort them, though it bee at a distance. The ancient Tradition of the *Vine* is far more strange : It is, that if you set a Stake, or Prop, some distance from it, it will grow that way ; Which is farre stranger (as is said) than the other ; For that *Water* may worke by a *Sympathy* of *Attraction* : But this of the *Stake* seemeth to bee a Reasonable Discourse.

463 It hath beene touched before, that *Terebration* of *Trees* doth make them prosper better. But it is found also, that it maketh the *Fruit* sweeter, and better. The *Cause* is, for that notwithstanding the *Terebration*, they may receiue Aliment sufficient ; And yet no more than they can well turne, and digest ; And withall doe sweat out the courstest and vnprofitablest Iuyce ; Euē as it is in *Living Creatures*, which by Moderate Feeding, and Exercise, and Sweat, attaine the soundest Habit of Body.

464 As *Terebration* doth *Meliorate Fruit*, so, vpon the like reason, doth *Letting* of *Plants* *Blond* ; As *Pricking Vines*, or other *Trees*, after they bee of some Growth ; And thereby letting forth *Gum*, or *Teares* ; Though this be not to continue, as it is in *Terebration*, but at some Seasons. And it is reported, that by this Artifice, *Bitter Almonds* haue beene turned into *Sweet*.

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The Ancients for the *Dulcorating* of *Fruit*, doe commend *Swines-dung*, aboute all other *Dung*; Which may be, because of the Moisture of that *Beast*, whereby the *Excrements* hath lesse Acrimony; For we see *Swines* and *Pigs* Flesh is the Moistest of Fleshes.

465

It is obserued by some, that all *Herbs* wax sweeter, both in Smell, and Taste, if after they be growne vp some reasonable time, they bee cut, and so you take the later Sprout. The *Cause* may bee, for that the longer the Iuyce stayeth in the Root, and Stalke, the better it concocteth. For one of the Chiefe Causes, why *Graines*, *Seeds*, and *Fruits*, are more Nourishing than *Leaues*, is the Length of time, in which they grow to *Maturation*. It were not amisse to keepe backe the Sap of *Herbs*, or the like, by some fit meanes, till the end of Summer; whereby (it may be) they will be more Nourishing.

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As *Grafting* doth Generally aduance and *Meliorate* *Fruits*, aboute that which they would bee, if they were set of *Kernels*, or *Stones*, in regard the *Nourishment* is better concocted; so (no doubt) euen in *Grafting*, for the same Cause the Choice of the *Stocke* doth much; Alwayes provided, that it bee somewhat inferiour to the *Cions*: For otherwise it dul-leth it. They commend much the *Grafting* of *Peares*, or *Apples*, vpon a *Quince*.

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Besides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is set downe as tried, that a *Mixture* of *Bran*, and *Swines-dung*; Or *Chaffe* and *Swines-dung*; (especially laid vp together for a Moneth to rot,) is a very great Nourisher, and Comforter to a *Fruit-Tree*.

468

It is deliuered, that *Onions* wax greater, if they bee taken out of the Earth, and laid a drying twenty daies, and then set againe; And yet more, if the outermost Pill be taken off all ouer.

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It is deliuered by some, that if one take the *Bough* of a *Low Fruit-Tree*, newly budded, and draw it gently, without hurting it, into an *Earthen Pot* perforate at the Bottome to let in the *Plant*, and then Couer the *Pot* with Earth, it will yeeld a very large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Posting* of *Plants*, without Remouing, and Leauing the *Fruit* in the Earth. The like, (they say,) will be effected, by an *Empty Pot*, without Earth in it, put ouer a *Fruit*, being propped vp with a *Stake*, as it hangeth vpon the *Tree*; And the better, if some few Pertusions bee made in the *Pot*. Wherein, besides the Defending of the *Fruit*, from Extremity of Sunne or Weather, some giue a reason, that the *Fruit*, Louing and Coueting the open Aire and Sunne, is inuited by those Pertusions, to spread and approach, as neere the open Aire, as it can; And so enlargeth in *Magnitude*.

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All *Trees* in *High* and *Sandy Grounds*, are to bee set deepe; And in *wa-try Grounds*, more shallow, And in all *Trees*, when they be remoued (especially *Fruit-Trees*) care ought to be taken, that the Sides of the *Trees* bee coasted, (*North*, and *South*, &c.) as they stood before. The same is said also of *Stone* out of the *Quarry*, to make it more durable; Though that

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seemeth to haue lesse reason; Because the *stone* lyeth not so neere the Sun, as the *Tree* groweth.

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Timber Trees in a *Coppice Wood*, doe grow better, than in an *Open Field*; Both because, they offer not to spread so much, but shoot vp still in Height; And chiefly because they are defended from too much Sunne and Wind, which doe checke the Growth of all *Fruit*; And so (no doubt) *Fruit-Trees*, or *Vines*, set vpon a *Wall*, against the Sunne, betweene Elbowes or Buttresses of Stone, ripen more, than vpon a *Plaine Wall*.

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It is said, that if *Potato Roots*, be set in a *Pot* filled with Earth, and then the *Pot* with Earth bee set likewise within the Ground, some two or three Inches, the *Roots* will grow greater, than Ordinary. The *Cause* may bee, for that hauing Earth enough within the *Pot* to nourish them; And then being stopped by the Bottome of the *Pot* from putting Strings downward, they must needs grow greater in Breadth and Thicknesse. And it may be, that all *Seeds*, or *Roots*, *Plotted*, and so set into the *Earth*, will prosper the better.

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The *Cutting off* the *Leanes* of *Radish*, or other *Roots*, in the beginning of Winter, before they wither; And couering againe the *Root*, something high with Earth; Will preferue the *Root* all Winter, and make it bigger, in the Spring following, as hath beene partly touched before. So that there is a double Vse of this *Cutting off* the *Leanes*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater: And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by Strengthening the *Root*, it will make the *Fruit* also the greater.

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It is an *Experiment* of great pleasure; to make the *Leanes* of *Shady Trees*, larger than ordinary. It hath beene tried (for certaine) that a *Gions* of a *wecch-Elme*, grafted vpon the Stocke of an Ordinary *Elme*, will put forth *Leanes*, almost as broad as the Brim of ones Hat. And it is very likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leanes*. It would be tried therefore in *Trees* of that kind chiefly; As *Birch*, *Aspe*, *willow*; And especially the *Shining willow*, which they call *Swallow-taile*, because of the pleasure of the *Leafe*.

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The *Barrennesse* of *Trees*, by *Accident*, (besides the *weaknesse* of the *Soile*, *Seed*, or *Root*; And the *Iniury* of the *Weather*) cometh either of their *Ouer-growing* with *Mosse*; Or their being *Hide-bonnd*; Or their *Planting too deepe*; Or by *Issuing* of the *Sap too much* into the *Leanes*. For all these there are *Remedies* mentioned before.

Experiments
in Consort,
touching Com-
pound Fruits
and Flowers.

Wee see that in *Liuing Creatures*, that haue *Male* and *Female*, there is *Copulation* of seuerall Kindes; And so *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horse* and the *Asse*; And some other *Compounds*, which wee call *Monsters*.

sters, though more rare : And it is held, that that *Prouerbe*, *Africa semper aliquid Monstri parit* ; commeth, for that the Fountains of Waters there, being rare; diuers sorts of Beasts come from seuerall Parts to drinke; And so being refreshed, fall to couple, and many times with seuerall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; Which neuertheless, if it be possible, is more at command, than that of *living Creatures*; For that their Lust requireth a voluntary Motion: wherefore it were One of the most Noble *Experimentens* touching *Plants*, to finde it out : For so you may haue great Variety of New *Fruits*, and *Flowers* yet vnknowne. *Grafting* doth it not : That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a New *Kinde*. For the *Cions* euer ouer-ruleth the *Stocke*.

It hath beene set downe by one of the *Ancients*, that if you take two *Twigs* of seuerall *Fruit Trees*, and flatt them on the sides, and then binde them close together, and set them in the ground, they will come vp in one *Stocke*; But yet they will put forth their seuerall *Fruits*, without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Vnity* of *Continuance*, is easier to procure, than *Vnity* of *Species*. It is reported also, that *Vines* of Red and white *Grapes*, being set in the Ground, and the vpper Parts being flatted, and bound close together, will put forth *Grapes* of the seuerall Colours vpon the same Branch; And *Grapestones* of seuerall Colours within the same *Grape* : But the more, after a yeere or two; The *Vnity* (as it seemeth) growing more Perfect. And this will likewise helpe, if from the first *Vniting*, they be often Watred; For all Moisture helpeth to *Vnion*. And it is prescribed also, to binde the *Bud*, as soone as it commeth forth, as well as the *Stocke*; At the least for a time.

They report, that diuers *Seeds*, put into a *Clout*, and laid in Earth well dunged, will put vp *Plants* *Contiguous*; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is said of *Kernels*, put into a *Bottle*, with a Narrow Mouth, filled with Earth.

It is reported, that young *Trees*, of seuerall kinds, set contiguous, without any binding, and very often Watred, in a *Fruitfull Ground*, with the very Luxury of the *Trees*, will incorporate, and grow together. Which seemeth to me the likeliest Meanes, that hath beene propounded; For that the *Binding* doth hinder the Naturall Swelling of the *Tree*; which, while it is in Motion, doth better unite.

There are many Ancient and Receiued Traditions, and Obseruations, touching the *Sympathy* and *Antipathy* of *Plants* :

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Experiments
in Consort
touching the
Sympathy and
Antipathy of
Plants.

For that some will thrive best growing neere others ; which they impute to *Sympathy* : And some worse ; which they impute to *Antipathy*. But these are Idle and Ignorant Conceits ; And forsake the true *Indication* of the *Causes* ; As the most Part of *Experiments*, that concerne *Sympathies* and *Antipathies* doe. For as to *Plants*, neither is there any such Secret *Friendship*, or *Hatred*, as they imagine ; And if wee should bee content to call it *Sympathy*, and *Antipathy*, it is utterly mistaken ; for their *Sympathy*, is an *Antipathy*, and their *Antipathy* is a *Sympathie*. For it is thus ; Wheresoeuer one *Plant* draweth such a particular Iuyce out of the Earth ; as it qualifieth the Earth ; So as that Iuyce which remaineth is fit for the other *Plant*, there the Neighbourhood doth good ; Because the Nourishments are contrary, or seuerall : But where two *Plants* draw (much) the same Iuyce, there the Neighbourhood hurteth ; For the one deceiueth the other.

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First therefore, all *Plants* that doe draw much *Nourishment* from the *Earth*, and so soake the *Earth*, and exhaust it, hurt all Things that grow by them ; As great *Trees*, (especially *Ashes*) and such *Trees*, as spread their *Roots*, neere the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently received) to the *Vine* onely ; But it is an Enemy to any other *Plant*, Because it draweth strongly the fattest Iuyce of the Earth. And if it be true, that the *Vine*, when it creepeth neere the *Colewort*, will turne away ; This may be, because there it findeth worse Nourishment ; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nourisheth.

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Where *Plants* are of seuerall Natures, and draw seuerall Iuyces out of the Earth, there (as hath beene said) the One set by the other helpeth. As it is set downe by diuers of the Ancients, that *Rew* doth prosper much, and becommeth stronger, if it be set by a *Figge-Tree* : which (we conceiue) is caused, Not by Reason of *Friendship* ; but by *Extraction* of a Contrary Iuyce : The one Drawing Iuyce fit to result Sweet, the other bitter. So they haue set downe likewise, that a *Rose* set by *Garlick* is sweeter : Which likewise maybe, because the more Fetide Iuyce of the Earth goeth into the *Garlicke*, and the more Odorate into the *Rose*.

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This wee see manifestly, that there be certaine *Corne-Flowers*, which come seldome or neuer in other places, vnlesse they bee set ; But onely amongst *Corne* : As the *Blew-bottle*, a kinde of *Yellow Mary-Gold*, *wilde Poppy*, and *Fumitory*. Neither can this bee, by Reason of the Culture of the Ground, by Plowing, or Furrowing ; As some *Herbs*, and *Flowers*, will grow but in *Ditches* new Cast ; For if the *Ground* lie fallow, and vnplowne, they will not come : So as it should seeme to bee the *Corne*,
that

that qualifieth the Earth, and prepareth it for their Growth.

This Obseruation, if it holdeth, (as it is very probable,) is of great vse for the *Meliorating* of Taste in *Fruits*, and *Escalent Herbes*; And or the *Sent* of *Flowers*. For I doe not doubt, but if the *Figge Tree* doe make the *Rew* more strong, and bitter, (as the Ancients haue noted,) good store of *Rew* planted about the *Fig-Tree*, will make the *Fig* more sweet. Now the *Tastes* that doe most offend in *Fruits*, and *Herbes*, and *Roots*, are *Bitter*; *Harrish*; *Sowre*; And *watrish*, or *Flasby*. It were good therefore to make the *Trialls* following.

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Take *wormewood*, or *Rew*, and set it neere *Lettuce*, or *Coleflory*, or *Artichoke*; And see whether the *Lettuce*, or the *Coleflory*, &c. become not the sweeter.

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Take a *Seruite-Tree*, or a *Cornelian-Tree*, or an *Elder-Tree*, which wee know haue *Fruits* of harsh and binding Iuyce, and set them neare a *Vine*, or *Figge-Tree*, and see whether the *Grapes*, or *Figger*, will not be the sweeter.

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Take *Cucumbers*, or *Pumpions*, and set them (here and there) amongst *Muske-Melions*, and see whether the *Melons* will not be more *Winy*, and better tasted. Set *Cucumbers* (likewise) amongst *Radish*, and see whether the *Radish* will not be made the more *Biting*.

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Take *Sorrell*, and set it amongst *Raspes*, and see whether the *Raspes* will not bee the sweeter.

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Take *Common Briar*, and set it amongst *Violets*, or *wall-Flowers*; and see whether it wil not make the *Violets*, or *wall-Flowers* sweeter, and lesse *Earthy* in their Smell. So set *Lettuce*, or *Cucumbers*, amongst *Rosemary*, or *Bayes*, and see whether the *Rosemary*, or *Bayes*, will not be the more *Odorate*, or *Aromaticall*.

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Contrariwise, you must take heed, how you set *Herbs* together, that draw much the like Iuyce. And therefore I thinke *Rosemary* will leese in Sweetnesse if it be set with *Lauender*, or *Bayes*, or the like. But yet, if you wil correct the strength of an *Herbe*, you shall do well to set other like *Herbs* by him, to take him downe, As if you should set *Tansy* by *Angelica*, it may be, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you should set *Rew* by *Common Worme-wood*, it may be, the *wormewood* would turne to be liker *Roman wormewood*.

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This *Axiome* is of large extent, And therefore would be seuered, and refined by *Triall*. Neither must you expect to haue a *Grosse Difference* by this kinde of Culture; but only *Further Perfection*.

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Triall would be also made in *Herbs Poisonous*, and *Purgatine*, whose ill Quality (perhaps) may be discharged, or attempted, by Setting stronger *Poisons*, or *Purgatines*, by them.

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It is reported, that the *Shrub* called *Our Ladies Seale*, (which is a Kind of *Eriony*,) and *Coleworts*, set neere together, one or both will die. The Cause is, for that they bee both great Depredatours of the Earth, and one of them starueth the other. The like is said of a *Reed*, and a *Brake*; Both which are succulent; And therefore the One deceineth

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cerueth the Other. And the like of Hemlocke and Rer, Both which draw strong Iuyces.

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Some of the Ancients, and likewise diuers of the Moderne Writers, that haue laboured in *Naturall Magick*, haue noted a *Sympathy*, between the *Sunne*, *Moone*, and some Principall *Starres*; And certaine *Herbs*, and *Plants*. And so they haue denominated some *Herbes Solar*, and some *Lunar*; And such like Toyes put into great Words. It is manifest, that there are some *Flowers*, that haue *Respect* to the *Sunne*, in two *Kindes*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mari-golds*, *Tulippa's*, *Pimpernell*, and indeed most *Flowers*, doe open or spread their leaues abroad, when the *Sunne* shineth serene and faire: And againe, (in some part,) close them, or gather them inward, either towards Night, or when the Skie is ouer cast. Of this there needeth no such Solemne Reason to be assigned; As to say, that they reioyce at the Presence of the *Sunne*; And mourne at the Absence thereof. For it is Nothing else, but a little Loading of the Leaues, and Swelling them at the Bottome, with the Moisture of the Aire, whereas the drie Aire doth extend them: And they make it a Peece of the wonder, that *Garden Clauer* will hide the *Stalke*, when the *Sunne* sheweth bright; Which is Nothing, but a full Expansion of the leaues. For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Mari-golds*; *wart-wort*; *Mallow Flowers*, and others. The *Cause* is somewhat more Obscure than the former; But I take it to be no other, but that the Part against which the *Sunne* beateh, waxeth more faint and flaccide in the *Stalke*; And thereby lesse able to support the *Flower*.

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What a little *Moisture* will doe in *Vegetables*, euen though they be dead, and seuered from the Earth, appeareth well in the Experiment of *Iuglers*. They take the *Beard* of an *Oate*; which (if you marke it well,) is wreathed at the Bottome, and one smooth entire *Straw* at the Top. They take only the Part that is Wreathed, and cut off the other, leauing the *Beard* halfe the Breadth of a finger in length. Then they make a little *Crosse* of a *Quill*, long-waies, of that Part of the *Quill*, which hath the *Pith*; And *Crosse*-waies of that peece of the *Quill*, without *Pith*; The whole *Crosse* being the Breadth of a Finger high. Then they pricke the Bottome where the *Pith* is, and thereinto they put the *Oaten-beard*, leauing halfe of it sticking forth of the *Quill*: Then they take a little white Box of wood, to deceiue Men, as if somewhat in the Box did worke the Feat: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Crosse* sinke downe, but to sticke. Then likewise by way of Imposture, they make a Question; As, who is the Fairest Woman in the Company? Or, Who hath a Gloue, or Card? And cause another to name diuers Persons: And vpon euery Naming, they sticke the *Crosse* in the Box, hauing first put it towards their Mouth, as if they charmed it; And the *Crosse* stirreth not; But when they come to the Person that they would take; As they hold the *Crosse* to their mouth, they

they touch the *Beard* with the Tip of their Tongue, and wet it; And so sticke the *Crosse* in the Box; And then you shall see it turne finely and softly, three or foure Turnes; Which is caused by the vntwining of the *Beard* by the Moisture. You may see it more euidently, if you sticke the *Crosse* betweene your Fingers, in Stead of the Box; And therefore you may see, that this Motion, which is effected by so little Wet, is stronger than the Closing or Bending of the Head of a *Marigold*.

It is reported by some, that the *Herbe* called *Rosa-Solis*, (whereof they make Strong Waters;) will at the Noone day, when the *Sunne* shineth hot and bright, haue a great Dew vpon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy*, that it hath with the *Sunne*. Men fauour Wonders. It were good first to bee sure, that the Dew that is found vpon it, bee not the Dew of the Morning Preserued, when the Dew of other *Herbs* is breathed away; for it hath a smooth and thicke Lease, that doth not discharge the Dew so soone, as other *Herbs* that are more Spungy and Porous. And it may bee *Purslane*, or some other *Herbe*, doth the like, and is not marked. But if it bee so, that it hath more Dew at Noone, than in the Morning, then sure it seemeth to bee an Exudation of the *Herbe* it selfe. As Plums sweat when they are set into the Ouen: for you will not (I hope) thinke, that it is like *Gedeons Fleece of Wooll*, that the Dew should fall vpon that, and nowhere else.

It is certaine, that the *Honey-dewes* are found more vpon *Oake-leaves*, than vpon *Ash*, or *Beech*, or the like; But whether any Cause bee, from the Lease it selfe, to concoct the Dew; Or whether it bee onely, that the Lease is Close and Smooth; (And therefore drinketh not in the Dew, but preserueth it;) may bee doubted: It would bee well inquired, whether *Manna* the Drug, doth fall but vpon certaine *Herbs* or *Leaves* onely. *Flowers* that haue deepe *Sockets*, doe gather in the Bottome, a kinde of *Honey*; As *Honey-suckles*; (both the *Woodbine*, and the *Trifoile*;) *Lillies*, and the like. And in them certainly the *Flower* beareth part with the Dew.

The Experience is, that the *Froth*, which they call *Woodseare*, (being like a kinde of Spittle,) is found but vpon certaine *Herbs*, and those Hot Ones; As *Lauender*, *Lauender-cotton*, *Sage*, *Hissope*, &c. Of the Cause of this enquire further; For it seemeth a Secret. There falleth also *Mildew* vpon *Corne*, and smutted it; But it may be, that the same falleth also vpon other *Herbs*, and is not obserued.

It were good; Triall were made; whether the great Consent betweene *Plants* and *water*, which is a principall Nourishment of them; will make an *Attraction* or Distance, and not at Touch onely. Therefore take a *Vessell*, and in the middle of it make a false Bottome of course *Camasse*: Fill it with Earth about the *Camasse*, and let not the Earth be watred; Then sow some good *Seeds* in that Earth; But vnder the *Camasse*, some halfe a foot in the Bottome of the *Vessell*, lay a great *sponge*, thorowly wet in water; And let it lye so some ten Dayes; And

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see whether the *Seeds* will sprout, and the *Earth* become more Moist, and the *Sponge* more dry. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of Water, is farre stranger than this.

THe *Altering* of the *Sent*, *Colour*, or *Taste* of *Fruit*, by *Infusing*, *Mixing*, or *Letting* into the *Barke*, or *Root* of the *Tree*, *Herbe*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Substance; are but *Fancies*. The *Cause* is, for that those Things haue passed their Period, and nourish not. And all *Alteration* of Vegetables, in those *Qualities*, must bee by somewhat that is apt to goe into the Nourishment of the *Plants*. But this is true; that where *Kine* feed vpon *wilde Garlicke*, their *Milke* tasteth plainly of the *Grelicke*; And the *Flesh* of *Mussons* is better tasted where the *Sheepe* feedem *wilde Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrus* of the *Liver*, by *Milke* of a *Cow*, that feedeth but vpon certaine *Herbs*; And *Honey* in *Spaine* smelleth (apparently) of the *Rose-Mary*, or *Orange*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Mayden* that was fed with *Napellus*; (which is counted the strongest Poyson of all *Vegetables*;) which with vse did not hurt the *Maid*, but poisoned some that had Carnall Company with her. So it is obserued by some, that there is a vertuous *Bezoar*, and another without vertue; which appeare to the shew alike; But the Vertuous is taken from the Beast, that feedeth vpon the Mountaines, where there are *Theriacall Herbs*; And that without Vertue, from those that feed in the Valleys, where no such *Herbs* are. Thus farre I am of Opinion; That as Steeped Wines and Beeres, are very *Medicinall*; and likewise Bread tempered with diuers Powders; So of *Meat* also (as *Flesh*, *Fish*, *Milke*, and *Egges*;) that they may bee made of great vse for *Medicine*, and *Diet*, if the *Beasts*, *Foule*, or *Fish*, be fed with a speciall kinde of food fit for the Disease. It were a dangerous Thing also for secret Empoysonments. But whether it may bee applied vnto *Plants*, and *Herbs*, I doubt more; Because the Nourishment of them is a more common Iuyce; which is hardly capable of any speciall Quality, vntill the *Plant* doe assimilate it.

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But lest our Incredulity may preiudice any profitable Operations in this kinde, (especially since Many of the Ancients haue set them downe,) We thinke good briefly to propound the foure *Meanes*, which they haue deuised of Making *Plants Medicinable*. The First is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it vp againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the Earth; And so the Nourishment is the more Common, and lesse Qualified: And besides it is a long time in Going vp, ere it come to the *Fruit*. The Second way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine*: Which is somewhat better: For if any Vertue be receined from the *Medicine*, it hath the lesse way, and the lesse time, to goe vp. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquor*, where-
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in the *Medicine* is *Infused* : Which I have little Opinion of, because the *Seed* (I doubt,) will not draw the Parts of the *Matter*, which have the *Propriety* : But it will bee farre the more likely, if you mingle the *Medicine* with *Dung* ; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watring* of the *Plant* oft, with an *Infusion* of the *Medicine*. This, in one respect, may have more force than the rest ; Because the *Medication* is oft renewed ; Whereas the rest are applied but at one time : And therefore the Vertue may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborne to receive those fine *Impressions* ; And besides, (as I said before,) they have a great *Hill* to goe vp. I

judge therefore the likeliest way to be the *Perforation* of the *Body* of the *Tree*, in *severall Places*, one above the other ; And the *Filling* of the *Holes* with *Dung* mingled with the *Medicine*.

And the *Watring* of those *Lumps* of *Dung*, with
Squirts of an *Infusion* of the *Medicine* in
Dunged Water, once in three
or foure *Dayes*.

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NATVRALL HISTORIE.

VI. Century.



VR *Experiments* we take care to be (as we haue often said) either *Experimēta Fructifera*, or *Lucifera*; either of *Vse*, or of *Discovery*: For we hate *Imposures*; And despise *Curiosities*. Yet because we must apply our selues somewhat to others, we will let downe some *Curiosities* touching *Plants*.

Experiments
in Consort
touching *Curiosities* about
Fruits and
Plants.

It is a *Curiosity*, to haue *seuerall Fruits* vpon *one Tree*; And the more; when some of them come *Early*, and some come *Late*; So that you may haue vpon the same *Tree*, *Ripe Fruits* all Sommer. This is easily done, by Grafting of *seuerall Cions*, vpon *seuerall Boughes*, of a Stock, in a good Ground, plentifully fed. So you may haue all Kindes of *Cherries*, and all Kindes of *Plums*, and *Peaches*, and *Apricots*, vpon *one Tree*; But I conceive the *Diuersity* of *Fruits* must be such, as will graft vpon the same Stocke. And therefore I doubt, whether you can haue *Apples*, or *Peares*, or *Orenges*, vpon the same Stocke, vpon which you graft *Plummies*.

501

It is a *Curiosity* to haue *Fruits* of *Diuers Shapes*, and *Figures*. This is easily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may haue *Cucumbers*, &c. as Long

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as a Cane; Or as Round as a Spheare; Or formed like a Crosse. You may haue also *Apples*, in the forme of *Peares*, or *Lemons*. You may haue also *Fruit* in more Accurate Figures; As we said of *Men*, *Beasts*, or *Birds*, according as you make the Moulds. Wherein you must vnderstand, that you make the Mould big enough, to containe the whole *Fruit*, when it is growne to the greatest: For else you will choake the Spreading of the *Fruit*; Which otherwise would spread it selfe, and fill the Concaue, and so be turned into the *Shape* desired; As it is in Mould-workes of Liquid Things. Some doubt may bee conceiued, that the Keeping of the Sunne from the *Fruit*, may hurt it: But there is ordinarie experience of *Fruit* that groweth Couered. *Quare* also, whether some small Holes, may not be made in the Wood, to let in the Sunne. And note, that it were best to make the Moulds partible, glued; or cemented together, that you may open them, when you take out the *Fruit*.

- 503 It is a *Curiosity*, to haue *Inscriptions*, or *Engrauings*, in *Fruit*, or *Trees*. This is easily performed, by *writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, so the Letters will grow more large, and Graphicall.

— *Tenerisq; meos incidere Amores*
Arboribus, crescent illa, crescentis Amores.

- 504 You may haue *Trees* apparelled with *Flowers*, or *Herbs*, by *Boring* Holes in the *Bodies* of them, and Putting into them *Earth* holpen with *Mucke*, and *Setting* *Seeds*, or *Slips*, of *Violets*, *Strawberries*, *wilde-Thyme*, *Camomill*, and such like in the *Earth*. Wherein they doe but grow, in the *Tree*, as they doe in *Pots*; Though (perhaps) with some Feeding from the *Trees*. It would be tried also with *Shoots* of *Vine*, and *Roots* of *Red-Roses*; For it may be, they being of a more Ligneous Nature, will incorporate with the *Tree* it selfe.

- 505 It is an ordinary *Curiosity*, to *Forme* *Trees* and *Shrubs*, (as *Rosemary*, *Iuniper*, and the like,) into *Sundry Shapes*; which is done by Moulding them within, and cutting them without. But they are but lame Things, being too small to keepe Figure: Great *Castles* made of *Trees* vpon Frames of *Timber*, with *Turrets*, and *Arches*, were matters of Magnificence.

- 506 Amongst *Curiosities*, I shall place *Colouration*, though it be somewhat better: For *Beauty* in *Flowers* is their Preheminence. It is obserued by some, that *Gilly-Flowers*, *Sweet williams*, *Violets*, that are *Coloured*, if they be neglected, and neither Watered, nor New Moulded, nor Transplanted, will turne *White*. And it is probable, that the *white* with much culture, may turne *Coloured*. For this is certaine, that the *white* *Colour* commeth of Scarcity of Nourishment; Except in *Flowers* that are onely *white*, and admit no other *Colours*.

- 507 It is good therefore, to see what *Natures* doe accompany what *Colours*; For by that you shall haue Light, how to induce *Colours*, by Producing those *Natures*. *Whites* are more Inodorate, (for the most part,) than

than *Flowers* of the same kinde *Coloured*; As is found in *Single White Violets*, *White-Roses*, *White Gilly-Flowers*, *White Stock-Gilly Flowers*, &c. We finde also, that *Blossomes* of *Trees*, that are *white*, are commonly *Inodorate*; As *Cherries*, *Peares*, *Plummes*; Whereas those of *Apples*, *Crabs*, *Almonds*, and *Peaches*, are *Blushy*, and smell sweet. The Cause is, for that the Substance that maketh the *Flower*, is of the thinnest and finest of the *Plant*; Which also maketh *Flowers* to bee of so dainty Colours. And if it bee too Sparing, and Thinne, it attaineth no Strength of Odour; Except it be in such *Plants*, as are very Succulent; Whereby they need rather to be scanted in their Nourishment, than replenished, to haue them sweet. As we see in *White Satyrion*, which is of a Dainty Smell; And in *Beane-Flowers*, &c. And againe, if the *Plant* bee of Nature, to put forth *white-Flowers* onely, and those not thinne, or dry, they are commonly of rancke and fulsome Smell; As *May-Flowers*, and *White Lillies*.

Contrariwise, in *Berries*, the *White* is commonly more Delicate, and Sweet in Taste, than the *Coloured*; As we see in *White Grapes*; In *White Raspes*; In *White Strawberries*; In *White Currans*, &c. The Cause is, for that the *Coloured* are more iuyced, and courser iuyced; And therefore not so well and equally Concocted; But the *white* are better proportioned, to the Digestion of the *Plant*.

But in *Fruits*, the *White* commonly is meaner; As in *Peare-plums*, *Damasins*, &c. And the Choicest *Plummes* are Blacke; The *Mulberry*, (which though they call it a *Berry*, is a *Fruit*;) is better the *Blacke*, than the *white*. The Haruest *white-Plumme*, is a base *Plumme*; And the *Verdoccio* and *White Date-Plumme*, are no very good *Plummes*. The Cause is, for that they are all Ouer-watry: Whereas an higher Concoction is required for Sweetnesse, or Pleasure of Taste; And therefore all your dainty *Plummes*, are a little dry, and come from the Stone; As the *Muscle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to bee *Blacke*, are of the Nature of *Berries*, sweetest such as are *Paler*; As the *Cœur-Cherry*, which inclineth more to *White*, is sweeter, than the *Red*; But the *Egriot* is more sowre.

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Cloue-Gilly-Flower*, which is the most Common;) And sow it; And there will come vp *Gilly-Flowers*, some of one Colour, and some of another, casually, as the *Seed* meeteth with Nourishment in the Earth; So that the *Gardiners* finde, that they may haue two or three *Roots* amongst an hundred, that are rare; and of great Price: As *Purple*, *Carnation* of seuerall *Stripes*; The Cause is (no doubt) that in *Earth*, though it be contiguous, and in one Bed, there are very seuerall *Iayces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which doe come vp *Purple*, doe alwaies come vp Single; The *Iayce*, as it seemeth, not being able to suffice a Succulent Colour, and a Double Lease. This Experiment of seuerall Co-

lours, comming vp from one *Seed*, would bee tried also in *Larkes-root*, *Monkes-Hood*, *Poppy*, and *Hollyoke*.

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Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Rose-Apple*, *Mulberries* likewise; and *Grapes*, though most toward the *Skinne*. There is a *Peach* also, that hath a *Circle of Red* towards the *Stone*: And the *Egriot-Cherry* is somewhat *Red* within; But no *Peare*, nor *Warden*, nor *Plumme*, nor *Apricot*, although they haue (many times) *Red* sides, are Coloured *Red* within. The *Cause* may be enquired.

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The Generall Colour of *Plants* is *Greene*; which is a Colour that no *Flower* is of. There a *Greenish Prime-Rose*, but it is *Pale* and scarce a *Greene*; The *Leaves* of some *Trees* turne a little *Murry*, or *Reddish*; And they be commonly *Young Leaves* that doe so; As it is in *Oakes*, and *Vines*, and *Hasse*. *Leaves* rot into a *Yellow*; And some *Hollies* haue part of their *Leaves Yellow*, that are, (to all seeming,) as *Fresh* and *Shining*, as the *Greene*. I suppose also, that *Yellow* is a leise *Succulent Colour*, than *Greene*; And a degree neerer *white*. For it hath beene noted, that those *Yellow Leaves* of *Holly* stand euer towards the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some *Plants Blond-Red*, *Stalke* and *Leafe*, and all; as *Amaranthus*. Some *Herbs* incline to *Purple*, and *Red*; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Rosa Solis*, &c. And some haue *White Leaves*, as another Kinde of *Sage*, and another Kinde of *Mint*; But *Azure*, and a *Faire Purple*, are neuer found in *Leaves*. This sheweth, that *Flowers* are made of a *Refined Iuyce*, of the *Earth*; And so are *Fruits*: But *Leaves* of a more *Course*, and *Common*.

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It is a *Curiosity* also to make *Flowers Double*; Which is effected by *Often Remouing* them into *New Earth*; As on the contrary Part, *Double Flowers*, by neglecting, and not *Remouing*, proue *Single*. And the Way to doe it speedily, is to sow or set *Seeds*, or *Slips of Flowers*; And as soone as they come vp, to remoue them into *New Ground*, that is good. Enquire also, Whether *Inoculating of Flowers*, (as *Stock-Gilly-Flowers*, *Roses*, *Musk-Roses*, &c.) doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Blossomes*; But that *Tree* beareth no *Fruit*; And, it maybe, that the same *Meanes*, which applied to the *Tree*, doth extremely accelerate the *Sap* to rise, and breake forth; Would make the *Tree* spend it selfe in *Flowers*, and those to become *Double*; Which were a great pleasure to see; Especially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that haue *Blossomes Blush-Coloured*.

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The *Making of Fruits*, without *Core* or *Stone*, is likewise a *Curiosity*; And somewhat better: Because whatsoener maketh them so, is like to make them more *Tender* and *Delicate*. If a *Cions* or *Shoot*, fit to be set in the *Ground*, haue the *Pith* finely taken forth, (and not altogether, but some of it left, the better to saue the life,) it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is said to bee, of diuiding a *Quick-Tree* downe to the *Ground*, and Taking out the *Pith*, and then binding it vp againe.

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It is reported also, that a *Citron* grafted vpon a *Quince*, will haue smal or no *Seeds*; And it is very probable, that any *Sowre Fruit*, grafted vpon a *Stock*, that beareth a *Sweeter Fruit*, may both make the *Fruit* sweeter, and more void of the harsh matter of *Kernels* or *Seeds*.

551

It is reported, that not onely the *Taking out* of the *Pith*, but the *Stopping* of the *Iuyce* of the *Pith*, from *Rising* in the *Middest*, and *Turning* it to rise on the *Outside*, will make the *Fruit* without *Core*, or *Stone*; As if you should bore a *Tree* cleane thorow, and put a wedge in. It is true, there is some *Affinity* betweene the *Pith* and the *Kernell*, because they are both of a harsh *Substance*, and both placed in the *Middest*.

516

It is reported, that *Trees* watered perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core*, or *Stone*: And the *Rule* is generall, that whatsoeuer will make a *Wild Tree* a *Garden-Tree*, will make a *Garden-Tree* to haue lesse *Core*, or *Stone*.

517

THe *Rule* is certaine, that *Plants* for want of *Culture*, degenerate to be baser in the same *Kind*; And sometimes, so farre, as to change into another *Kinde*. 1. The *Standing long*, and not being *Remoued*, maketh them degenerate. 2. *Drought*, vniess the *Earth* of it selfe be moist, doth the like. 3. So doth *Remouing* into worse *Earth*, or *Forbearing* to *Compost* the *Earth*; As we see, that *Water-Mint* turneth into *Field-Mint*; And the *Colewort* into *Rape* by neglect, &c.

Experiments
in Consort
touching the
Degenerating
of Plants; And
of the Transmu-
tation of them,
one into ano-
ther.

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Whatsoeuer *Fruit* vlieth to be set vpon a *Root* or a *Slip*, if it be sowne, will degenerate. *Grapes* sowne; *Figs*, *Almonds*, *Pomgranate Kernels* sowne; make the *Fruits* degenerate, and become *Wilde*. And againe, Most of those *Fruits* that vie to bee grafted, if they be set of *Kernels*, or *Stones*, degenerate. It is true, that *Peaches* (as hath beene touched before) doe better vpon *Stones* Set, than vpon *Grafting*; And the *Rule* of Exception should seeme to be this; That whatsoeuer *Plant* requireth much *Moisture*, prospereth better vpon the *Stone*, or *Kernell*, than vpon the *Graft*. For the *Stocke*, though it giueth a finer *Nourishment*, yet it giueth a scantier, than the *earth* at large.

Seeds, if they be very *Old*, and yet haue strength enough to bring forth a *Plant*, make the *Plant* degenerate. And therefore skilfull *Gardiners* make triall of the *Seeds*, before they buy them, whether they be good or no, by putting them into *Water* gently *Boyled*; And if they bee good, they will sprout within *Halfe an Houre*.

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It is strange which is reported, that *Basil* too much exposed to the *Sunne*, doth turne into *wilde Thyme*: Although those two *Herbs* seeme to haue small *Affinity*; but *Basil* is almost the only *Hot Herbe*, that hath *Fat* and *Succulent Leanes*; Which *Oylineffe*, if it be drawn forth by the *Sunne*, it is like it will make a very great *Change*.

521

There is an old *Tradition*, that *Boughs of Oake*, put into the *Earch*, will put forth *wilde Vines*: Which if it be true (no doubt) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* *Putrifying*, qualifieth the *Earth*, to put forth a *Vine* of it selfe.

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It is not impossible, and I have heard it verified, that vpon Cutting downe of an Old Timber Tree, the Stub hath put out sometimes a Tree of another Kinde; As that Beech hath put forth Birch; Which, if it bee true, the Cause may be, for that the old Stub is too scant of Iuyce, to put forth the former Tree; And therefore putteth forth a Tree of a smaller kinde, that needeth lesse Nourishment.

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There is an Opinion in the Countrey, that if the same Ground be oft sowne, with the Graine that grew vpon it, it will in the end, grow to be of a baser kinde.

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It is certaine, that in very sterile Teeres, Corne sowne will grow to another Kinde.

*Grandia sepe quibus mandauimus Hordea Sulcis,
Infelix Lolium, & steriles dominantur Avena.*

And generally it is a Rule, that Plants, that are brought forth by Culture as Corne, will sooner change into other Species, than those that come of themselves: For that Culture giueth but an Aduentitious Nature, which is more easily put off.

This worke of the Transmutation of Plants, one into another, is inter Magnalia Naturæ: For the Transmutation of Species is, in the vulgar Philosophy, pronounced Impossible: And certainly, it is a thing of difficulty, and requireth deepe Search into Nature: But seeing there appeare some manifest Instances of it, the Opinion of Impossibility is to bee reiected; And the Meanes thereof to bee found out. Wee see, that in Liuing Creatures, that come of Putrefaction, there is much Transmutation, of one into another; As Catterpillars turne into Flies, &c. And it should seeme probable, that whatloeuere Creature, hauing life, is generated without Seed, that Creature will change out of one Species into another. For it is the Seed, and the Nature of it, which locketh and boundeth in the Creature, that it doth not expatiate. So as wee may well conclude, that seeing the Earth, of it selfe, doth put forth Plants, without Seed, therefore Plants may well haue a Transmigration of Species. Wherefore wanting Instances, which doe occurre, wee shall giue Directions of the most likely Trialls: And generally, wee would not haue those, that read this our Worke of Sylua Sylvarum, account it strange, or thinke that it is an Ouer-Haste, that wee haue set downe Particulars vntried; For contrariwise, in our owne Estimation, wee account such Particulars, more worthy, than those that are already

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not
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ready tried and knowne. For these Later must be taken as you finde them; But the Other doe leuell Point blanke at the *Inuenting*, of *Causes*, and *Axiomes*.

First therefore you must make account, that if you will haue one *Plant* change into another, you must haue the *Nourishment* ouer-rule the *Seed*; And therefore you are to practice it by *Nourishments* as contrary as may be, to the *Nature* of the *Herbe*, So neuerthelesse as the *Herb* may grow; And likewise with *Seeds* that are of the Weakest Sort, and haue least Vigour. You shall doe well therefore, to take *Marsh Herbs*, and Plant them vpon Tops of Hills, and Champaignes, And such *Plants* as require much Moisture, vpon Sandy and very dry Grounds. As for Example *Marsh-Mallows*, and *Sedge*, vpon Hills; *Cucumber* and *Lettuce-Seeds*, and *Coleworts*, vpon a Sandy Plot: So contrariwise plant *Bushes*, *Heath*, *Long*, and *Brakes*, vpon a wet or *Marsh Ground*. This I conceiue also, that all *Esculent* and *Garden-Herbs*, set vpon the Tops of Hills, will proue more *Medicinall*, though lesse *Esculent*, than they were before. And it may be likewise, some *wilde-Herbs* you may make *Sallet-Herbs*. This is the first Rule for *Transmutation* of *Plants*.

The second Rule shall be to bury some few *Seeds*, of the *Herbe* you would change, amongst other *Seeds*; And then you shall see, whether the Iuyce of those other *Seeds*, doe not so qualifie the Earth, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parsly-Seed* amongst *Onion-Seed*; Or *Lettuce-Seed* amongst *Parsly-Seed*; Or *Basil-Seed* amongst *Thyme-Seed*; And see the Change of Taste, or otherwise. But you shall doe well, to put the *Seed* you would change, into a little linnen Cloth, that it mingle not with the forraine *Seed*.

The third Rule shall be, the *Making* of some *Medley* or *Mixture* of Earth, with some other *Plants* bruised, or shauen, either in *Leafe* or *Root*: As for example, make Earth with a *Mixture* of *Colewort-Leaues*, stamped, and set in it *Artichoakes*, or *Parsnips*; So take Earth made with *Maioram*, or *Origanum*, or *wilde-Thyme*, bruised, or stamped, and set in it *Fennell-Seed*, &c. In which Operation, the Processe of Nature still will be, (as I conceiue) not that the *Herbe* you worke vpon, should draw the Iuyce of the Forraine *Herbe*, (For that Opinion we haue formerly reiected;) But that there will be a New Confection of Mould, which perhaps will alter the *Seed*, and yet not to the kinde of the former *Herbe*.

The fourth Rule shall be, to marke what *Herbs*, some Earths doe put forth of themselues; And to take that Earth, and to Pot it, or to Vessell it; And in that to set the *Seed* you would change: As for example, take from vnder Walls, or the like, where *Nettles* put forth in abundance, the Earth which you shall there finde, without any *String*, or *Root*, of the *Nettles*; And Pot that Earth, and set in it *Stock-gilly-flowres*, or *Wall-flowres*, &c. Or sow in the *Seeds* of them; And see what the Euent will be: Or take Earth, that you haue prepared to put forth *Mush-*
romes.

comes, of it selfe, (whereof you shall find some *Instances* following;) And sow in it *Purslane-Seed*, or *Lettuce-Seed*; For in these *Experiments*, it is likely enough, that the earth being accustomed to send forth one Kinde of Nourishment, will alter the new *Seed*.

530

The fifth Rule shall be, to make the *Herbe* grow contrary to his Nature; As to make *Ground-Herbs* rise in *Heighth*: As for example; Carry *Carnomill*, or *wilde-Thyme*, or the *Greene Strawberry*, vpon *Stickes*, as you doe *Hops* vpon *Poles*; and see what the Euent will be.

531

The sixth Rule shall be, to make *Plants* grow out of the *Sunne*, or *Open Aire*; For that is a great Mutation in Nature; And may induce a Change in the *Seed*: As barrell vp *Earth*, and sow some *Seed* in it, and put it in the Bottom of a Pond; Or put it in some great hollow *Tree*; Trie also the Sowing of *Seeds*, in the Bottomes of *Cauces*; And *Pots* with *Seeds* sowne, hanged vp in *Wells*, some distance from the *Water*, and see what the Euent will be.

Experiments
in Consort,
touching the
Procerity, and
Lownesse, and
Artificial dwarf-
ing of Trees.

532

IT is certaine, that *Timber-Trees* in *Coppice woods*, grow more vpright, and more free from *Vnder-Boughes*, than those that stand in the *Fields*: The Cause whereof is, for that *Plants* haue a *Naturall Motion*, to get to the *Sunne*; And besides, they are not glutted with too much Nourishment; For that the *Coppice* shareth with them; And Repletion euer hindreth *Stature*; Lastly, they are kept warme; And that euer in *Plants* helpeth *Mounting*.

533

Trees, that are, of themselves, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gummes*), as *Firres*, and *Pines*, mount of themselves in *Heighth* without *Side-Boughes*, till they come towards the *Top*. The Cause is, partly *Heat*; And partly *Tenuity* of *Iuyce*; Both which send the *Sap* vpwards. As for *Iuniper*, it is but a *Shrub*, and groweth not big enough in *Body*, to maintaine a tall *Tree*.

534

It is reported, that a Good Strong *Canuas*, spread ouer a *Tree* grafted low, soone after it putteth forth, will dwarf it, and make it spread. The Cause is plaine; For that all things that grow, will grow as they finde *Roome*.

535

Trees are generally set of *Roots*, or *Kernels*; But if you set them of *Slips* (as of some *Trees* you may, by name the *Mulberry*), some of the *Slips* will take; And those that take, (as is reported,) will be *Dwarfe-Trees*. The Cause is, for that a *Slip* draweth Nourishment more weakly, than either a *Root*, or *Kernell*.

536

All *Plants*, that put forth their *Sap* hastily, haue their *Bodies* not proportionable to their *Length*; And therefore they are *Winders*, and *Creepers*; As *Iuy*, *Briony*, *Hops*, *woodbine*: Whereas *Dwarfing* requireth a slow Putting forth, and lesse *Vigour* of *Mounting*.

Experiments
in Consort
touching the

The *Scripture* saith; that *Salomon* wrote a *Naturall History*, from the *Cedar of Libanus*, to the *Mosse* growing vpon the *Wall*:

For

For ſo the beſt *Translations* haue it. And it is true that *Moffe* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, of *Barke*.

537

Moffe groweth chiefly vpon *Ridges* of *Houſes*, tiled or thatched; And vpon the *Crests* of *Walls*. And that *Moffe* is of a lightſome, and pleaſant Greene, The Growing vpon *Slopes* is cauſed, for that *Moffe*, as on the one ſide it commeth of *Moifture* and *Water*, ſo on the other ſide the *Water* muſt but *Slide*, and not *Stand* or *Poole*. And the Growing vpon *Tiles*, or *walls*, &c. is cauſed, for that thoſe dried *Earths*, hauing not *Moifture* ſufficient to put forth a *Plant*, doe praſtiſe *Germination* by Putting forth *Moffe*; Though when by *Age*, or otherwiſe, they grow to relent and reſolue, they ſometimes put forth *Plants*; As *wall-Flowers*. And almoſt all *Moffe* hath here and there little *Stalkes*, beſides the low *Thrumme*.

538

Moffe groweth vpon *Alleyes*, eſpecially ſuch as lye *Cold*, and vpon the *North*; As in diuers *Tarraces*: And againe, if they be much trodden; Or if they were, at the firſt, grauelled; for whereſoeuer *Plants* are kept downe, the *Earth* putteth forth *Moffe*.

539

Old Ground, that hath beene long vnbroken vp, gathereth *Moffe*: And therefore *Husbandmen* uſe to cure their *Pature Grounds*, when they grow to *Moffe*, by *Tilling* them for a yeare, or two: Which alſo dependeth vpon the ſame *Cauſe*; For that, the more *Sparing*, and *Staruing* Iuyce of the *Earth*, inſufficient for *Plants*, doth breed *Moffe*.

540

Old Trees, are more *Moffe*, (farre) than *Young*; For that the *Sap* is not ſo francke as to riſe all to the *Boughes*, but tireth by the way, and putteth out *Moffe*.

541

Fountaines haue *Moffe* growing vpon the *Ground* about them;

Muſcoſi Fontes; —————

The *Cauſe* is, for that the *Fountaines* draine the *Water* from the *Ground* *Adiacent*, and leaue but ſufficient *Moifture* to breed *Moffe*: And beſides, the *Coldneſſe* of the *Water*, conduceth to the ſame.

542

The *Moffe* of *Trees*, is a kinde of *Haire*; For it is the Iuyce of the *Tree*, that is *Excerned*, and doth not *Aſſimilate*. And vpon great *Trees* the *Moffe* gathereth a *Figure*, like a *Leafe*.

543

The *Moſteſt* Sort of *Trees* yeeld little *Moffe*; As wee ſee in *Aſpes*, *Po-plars*, *Willowes*, *Beeches*, &c. Which is partly cauſed, for the reaſon that hath beene giuen, of the francke Putting vp of the *Sap* into the *Boughes*; And partly, for that the *Barkes* of thoſe *Trees*, are more *Cloſe* and *Smooth*, than thoſe of *Oakes*, and *Aſhes*; Whereby the *Moffe* can the hardlier iſſue out.

544

In *Clay-Grounds*, all *Fruit-Trees* grow full of *Moffe*, both vpon *Body* and *Boughes*, Which is cauſed, partly by the *Coldneſſe* of the *Ground*, whereby the *Plants* nourish leſſe; And partly by the *Toughneſſe* of the *Earth*, whereby the *Sap* is ſhut in, and cannot get up, to ſpread ſo franckly, as it ſhould doe.

545

We haue said heretofore, that if *Trees* be *Hide-bound*, they wax lesse Fruitfull, and gather *Mosse*: And that they are holpen by *Hacking*, &c. And therefore by the reason of Contraries, if *Trees* bee bound in with *Cords*, or some Outward *Bands*, they will put forth more *Mosse*: Which (I thinke) happeneth to *Trees* that stand Bleake, and vpon the Cold Winds. It would also be tried, whether if you couer a *Tree*, somewhat thicke vpon the top, after his Powling, it will not gather more *Mosse*. I thinke also, the *watring* of *Trees* with Cold Fountaine-water, will make them grow full of *Mosse*.

546

There is a *Mosse* the *Perfumers* haue, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quere* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* sake, being a Thing of Price, I haue set downe the last *Experiments*, how to multiply, and call on *Mosses*.

Next vnto *Mosse*, I will speake of *Musbromes*; Which are likewise an *Vnperfect Plant*. These *Musbromes* haue two strange *Properties*; The One, that they yeeld so *Delicious* a *Meat*; The other, that they *come* vpo so *hastily*; As in a *Night*; And yet they are *Vnsowne*. And therefore, such as are Vp-starts in State, they call, in reproach, *Musbromes*. It must needs be therefore, that they bee made of much *Moisture*; And that *Moisture* Fat, Grosse, and yet somewhat Concocted. And (indeed) we finde that *Musbromes* cause the *Accident*, which we call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfet* of them may Suffocate, and Emplayson. And this sheweth, that they are Windy; And that Windinesse is Grosse, and Swelling; Not Sharpe, or Griping. And vpon the same reason *Musbromes* are a venereous Mear.

547

It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the Moistest of *Trees*;) cut small, and cast into *Furrowes* well dunged, will cause the Ground to put forth *Musbromes*, at all *Seasons* of the *Yeare*. fit to be eaten. Some adde to the Mixture *Leauen* of *Bread*, resolued in *water*.

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It is reported, that if a *Hilly-Field*, where the *Stubble* is standing, bee set on *Fire*, in a *Showrie Season*, it will put forth great Store of *Musbromes*.

549

It is reported that *Harts-Horne*, *Shauen*, or in *Small Peeeces*, mixed with *Dung*, and *watred*, putteth vp *Musbromes*. and we know *Harts-Horne* is of a Fat and Clammie Substance: And it may be *Oxe-Horne* would doe the like.

550

It hath beene reported, though it be scarce credible, that *Iuy* hath growne out of a *Stags-Horne*; Which they suppose, did rather come from

from a Confrication of the Horne vpon the Iuy, than from the Horne it selfe. There is not knowne any Substance, but *Earth*, and the *Procedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Mosse*, or *Herby Substance*. There may be triall made of some *Seeds*, as that of *Fennell-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow.

There is also another *Vnperfect Plant*, that (in shew) is like a great *Mushrome*. And it is sometimes as broad as ones *Hat*, Which they call a *Toads-Stoole*: But it is not Eitulent; And it groweth (commonly) by a dead Stub of a *Tree*; And likewise about the *Roots* of *Rotten Trees*: And therefore seemeth to take his Iuyce from *wood Putrified*. Which sheweth, by the way, that *wood Putrified* yeeldeth a franke *Moisture*.

There is a *Cake*, that groweth vpon the side of a *Dead Tree*, that hath gotten no Name, but it is large, and of a *Chestnut Colour*, and hard, and pithy; Whereby it should seeme, that euen *Dead Trees* forget not their Putting forth; No more than the *Carcafes* of *Mens Bodies*, that put forth *Haire*, and *Nailles*, for a Time.

There is a *Cod*, or *Bagge*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after growth of a *Mushrome Colour*, and full of light *Dust* vpon the Breaking: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to bee good for *Kibes*. Belike it hath a *Corrosiue*, and *Fretting Nature*.

There is an *Herbe* called *Iewes-Eare*, that groweth vpon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Asbes*. It hath a strange Property; For in *warne-water*, it swelleth, and openeth extremely. It is not greene, but of a duskie browne Colour. And it is vsed for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to haue a *Mollifying*, and *Lenifying Vertue*.

There is a Kinde of *Spongie Exorescence*, which groweth chiefly vpon the *Roots* of the *Laser-Tree*; And sometimes vpon *Cedar*, and other *Trees*. It is very *White*, and *Light*, and *Friable*: Which we call *Agaricke*. It is famous in *Physicke* for the *Purging* of *Tough flegmes*. And it is also an excellent *Opener* for the *Liner*: But *Offensiue* to the *Stomacke*; And in *Taste* it is, at the first, *Sweet*, and after *Bitter*.

We finde no *Super-Plant*, that is a *Formed Plant*, but *Misseltroe*. They haue an idle Tradition, that there is a *Bird*, called a *Missel-bird*, that feedeth vpon a *Seed*, which many times she cannot digest, and so expelleth it whole with her Excrement: which falling vpon a *Bough* of a *Tree* that hath some *Ris*, patted forth the *Misseltroe*. But this is a *Fable*: For it is not probable, that *Birds* should feed vpon that they cannot digest. But allow that, yet it cannot be for other *Reasons*: For first, it is found but vpon certaine *Trees*; And those *Trees* beare no such *Fruit*, as may allure that *Bird* to sit, and feed vpon them. It may be, that *Bird* feedeth vpon the *Misseltroe Berries*, and so is often found there; Which may haue giuen occasion to the *Tale*. But that which maketh an End of the *Question*

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tion, is, that *Misseltoe* hath beene found to put forth vnder the *Boughes*, and not (only) aboue the *Boughes*: So it cannot be any Thing that falleth vpon the *Bough*. *Misseltoe* groweth chiefly vpon *Crab-Trees*, *Apple-Trees*, sometimes vpon *Hassles*; And rarely vpon *Oakes*; The *Misseltoe* whereof is counted very *Medicinall*. It is euer greene, Winter and Summer; And beareth a white *Glistering Berry*: And it is a *Plant* vtterly differing from the *Plant*, vpon which it groweth. Two things therefore maybe certainly set downe: First, that *Super-satiation* must be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* must be such, as the *Tree* doth exerce, and cannot assimilate; For else it would goe into a *Bough*; And besides, it seemeth to bee more Fat and Viscuous, than the Ordinary *Sap* of the *Tree*; Both by the *Berry*, which is Clammie; And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

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This *Experiment* of *Misselsoe* may giue Light to other Practises. Therefore Triall would bee made, by ripping of the *Bough* of a *Crab-Tree* in the *Barke*; And *Watring* of the wound euery Day, with *warme Water Dugged*, to see if it would bring forth *Misseltoe*, or any such like Thing. But it were yet more likely to trie it, with some other *Watring*, or *Anointing*, that were not so Naturall to the *Tree*, as *water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they bee such Things as kill not the *Bough*.

558

It were good to trie, what *Plants* would put forth, if they bee forbidden to put forth their *Naturall Boughes*: Poll therefore a *Tree*, and couer it, some thicknesse, with *Clay* on the Top; And see what it will put forth. I suppose it will put forth *Roots*; For so will a *Cions*, being turned downe into *Clay*: Therefore, in this *Experiment* also, the *Tree* would be closed with somewhat, that is not so Naturall to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Cloth*, or *Painting*, so it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

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A man may count the *Prickles* of *Trees* to be a kinde of *Excrecence*; For they will neuer be *Boughes*, nor beate *Leanes*. The *Plants* that haue *Prickles*, are *Thornes*, blacke and white; *Brier*; *Rose*; *Limon-Trees*; *Crab-Trees*; *Goose-Berry*; *Berber*; These haue it in the *Bough*; The *Plants* that haue *Prickles* in the *Leafe*, are; *Holly*; *Iuniper*; *whin-bush*; *Thistle*; *Nettles* also haue a small venomous *Prickle*; So hath *Burrage*, but harmelesse. The *Cause* must be *Hasty Putting forth*; *Want of Moisture*; And the *Closenesse* of the *Barke*; For the *Haste* of the *Spirit* to put forth, and the *Want* of *Nourishment* to put forth a *Bough*, and the *Closenesse* of the *Barke*, cause *Prickles* in *Boughes*; And therefore they are euer like a *Pyramis*, for that the *Moisture* spendeth after a little *Putting forth*. And for *Prickles* in *Leanes*, they come also of *Putting forth more Iuyce* into the *Leafe*, than can spread in the *Leafe* smooth; And therefore the *Leanes* otherwise are *Rough*, as *Borrage* and *Nettles* are. As for the *Leanes* of *Holly*, they are *Smooth*, but neuer *Plaine*, but as it were with *Folds* for the same *Cause*.

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There bee also *Plants*, that though they haue no *Prickles*, yet they haue a kinde of *Downy* or *Veluet Rine*, vpon their *Leaues*; As *Rose-Campion*, *Stock-Gilly-Flowers*, *Colts-Foot*; which *Downe*, or *Nap* commeth of a *Subtill Spirit*, in a *Soft* or *Fat Substance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Rose-Campions*, stamped, haue beene applyed, (with successe) to the *wrests* of those that haue had *Tertian*, or *Quartan Agnes*; And the *Vapour* of *Colts-Foot* hath a *Sanatiue* vertue, towards the *Lungs*; And the *Leafe* also is *Healing* in *Surgery*.

Another Kinde of *Extrescense* is an *Exudation* of *Plants*, ioyned with *Putrefaction*; As wee see in *Oake-Apples*, which are found chiefly vpon the *Leaues* of *Oakes*; And the like vpon *willowes*; And Countrey People haue a kinde of *Prediction*, that if the *Oake-Apple*, broken, be full of *wormes*, it is a *Signe* of a *Pestilent Yeere*; Which is a likely Thing, because they grow of *Corruption*.

There is also vpon *Sweet*, or other *Brier*, a fine *Tuft*, or *Brush* of *Mosse*, of diuers Colours; Which if you cut, you shall euer finde full of little *white wormes*.

It is certaine, that *Earth*, taken out of the *Foundations* of *Vaults* and *Houses*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth *Sundry Kinds* of *Herbs*; But some *Time* is required, for the *Germination*; for if it be taken, but from a *Fathome* deepe, it will put forth the *First Yeere* If much deeper, not till after a *Yeere*, or *Two*.

The *Nature* of the *Plants* growing out of *Earth* so taken vp, doth follow the *Nature* of the *Mould* it selfe; As if the *Mould* be *Soft*, and *Fine*, it putterth forth *Soft Herbs*; As *Grasse*, *Plantine*, and the like; If the *Earth* be *Harder* and *Courser*, it putterth forth *Herbs* more *Rough*, as *Thistles*, *Firres*, &c.

It is Common *Experience*, that where *Alleyes* are close *Gravelled*, the *Earth* putterth forth, the first yeere, *Knot-grasse*, and after *Spire-grasse*. The *Cause* is, for that the *Hard Gravel*, or *Pebble* at the first *Laying*, will not suffer the *Grasse* to come forth vpriight, but turneth it to finde his way where it can; But after that the *Earth* is somewhat loosened at the *Top*, the Ordinary *Grasse* commeth vp.

It is reported, that *Earth*, being taken out of *Shady* and *watry Woods*, some depth, and Potted, will put forth *Herbs* of a *Fat* and *Iuicy Substance*; As *Penny-wort*, *Purslane*, *Houslecke*, *Penny-royall*, &c.

The *Water* also doth send forth *Plants*, that haue no *Roots* fixed in the *Bottomie*; But they are lesse *Perfect Plants*, being almost but *Leaues*, and those small ones: Such is that wee call *Duck-Weed*, which hath a *Leafe* no bigger than a *Thyme-Leafe*, but of a fresher *Greene*, and putterth forth a little *String* into the *water*, farre from the *Bottomie*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And so haue a Number of other *Herbs* that grow in *Ponds*.

It is reported by some of the *Ancients*, and some *Moderne Testimony* likewise, that there be some *Plants*, that grow vpon the *Top* of the *Sea*;

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in Consort
touching the
Producing of
Perfect Plants
without Seed.

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Being supposed to grow of some Concretion of *Slime* from the *water*, where the *Sunne* beatech hot, and where the *Sea* stirreth little. As for *Alga Marina* (*Sea-weed*;) and *Eryngium* (*Sea Thistle*) both haue *Roots*; but the *Sea-weed* vnder the *water*, the *Sea-Thistle* but vpon the *Shore*.

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The *Ancients* haue noted, that there are some *Herbs*, that grow out of *Snow*, laid vp close together, and *Putrified*; And that they are all *Bitter*; And they name one specially, *Flomus*, which we call *Moth-Mullein*. It is certaine, that *wormes* are found in *Snow* commonly, like *Earth-wormes*; And therefore it is not vnlike, that it may likewise put forth *Plants*.

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The *Ancients* haue affirmed, that there are some *Herbs*, that grow out of *Stone*; Which may be, for that it is certaine, that *Toads* haue bin found in the Middle of a *Free-Stone*. Wee see also, that *Flints*, lying aboue *Ground*, gather *Mosse*; And *wall-flowers*, and some other *Flowers*, grow vpon *Walls*; But whether vpon the *Maine Bricke*, or *Stone*, or whether out of the *Lime* or *Chinkes*, is not well obserued; For *Elders* and *Asbes* haue beene seene to grow out of *Steeple*s: But they manifestly grow out of *Clefts*; In so much as when they grow big, they will disioyne the *Stone*. And besides it is doubtfull, whether the *Mortar* it selfe putterh it forth, or whether some *Seeds* be not let fall by *Birds*. There be likewise *Rocke-Herbs*; But I suppose those are, where there is some *Mould* or *Earth*. It hath likewise beene found, that great *Trees* growing vpon *Quarries*, haue put downe their *Root* into the *Stone*.

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In some *Mines* in *Germany*, as is reported, there grow in the *Bottom* *Vegetables*; And the *work-Folkes* vse to say, they haue *Magicall Vertue*; And will not suffer *Men* to gather them.

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The *Sea-Sands* seldome beare *Plants*. Whereof the *Cause* is yeelded, by some of the *Ancients*, for that the *Sunne* exaleth the *Moisture*, before it can incorporate with the *Earth*, and yeeld a *Nourishment* for the *Plant*. And it is affirmed also, that *Sand* hath (alwaies) his *Root* in *Clay*; And that there be no *Veines* of *Sand*, any great depth within the *Earth*.

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It is certaine, that some *Plants* put forth for a time, of their owne *Store*, without any *Nourishment* from *Earth*, *Water*, *Stone*, &c. Of which *Vide* the *Experiment 29*.

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in Consort
touching For-
raine Plants.

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It is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballast* of *Ships*, cast vpon some *Grounds* in *Italy*, did put forth *Forraine Herbs*, to vs in *Europe* not knowne; And that which is more, that of their *Roots*, *Barkes*, and *Seeds*, confused together, and mingled with other *Earth*, and well Watred with *Warne Water*, there came forth *Herbs* much like the Other.

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Plants brought out of *Hot Countries*, will endeouour to put forth, at the same *Time*, that they vsually do in their owne *Climate*; And therefore to preserue them, there is no more required, than to keepe them from the *Iniury* of Putting backe by *Cold*. It is reported also, that *Graine* out

of.

of the *Hotter Countries* translated into the *Colder*, will be more forward; than the Ordinary *Graine* of the *Cold Countrie*. It is likely, that this will prove better in *Graines*, than in *Trees*; For that *Graines* are but *Annuall*; And so the *Vertue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embayed by the *Ground*, to which it is Remoued.

Many *Plants*, which grow in the *Hotter Countries*; being let in the *Colder*, will neuertheless, even in those *Cold Countries*, being sowne of *Seeds* late in the *Spring*, come vp and abide most Part of the *Summer*; As wee finde it in *Orange* and *Limon-Seeds*, &c. The *Seeds* whercof, Sowne in the End of *Aprill*, will bring forth Excellent *Sallers*, mingled with other *Herbs*. And I doubt not but the *Seeds* of *Clove-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be sowne, would doe the like.

Here be some *Flowers*, *Blossomes*, *Graines*, and *Fruits*, which come more *Early*. And Others which come more *Late* in the *Yeere*. The *Flowers* that come early, with vs, are, *Prime-Roses*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and some early *Tulippals*. And they are all *Cold Plants*; Which therefore (as it should seeme) haue a quicker *Perception*, of the *Heat* of the *Sunne* Increasing, than the *Hot Herbs* haue; As a *Cold Hand* will sooner finde a little *warmth*, than a *Hot*. And those that come next after, are *Wall-Flowers*, *Camslips*, *Hyacinths*, *Rose-mary-Flowers*, &c. And after them, *Pinks*, *Roses*, *Flowerdeluces*, &c. And the latest are *Gilly-Flowers*, *Holly-oakes*, *Darks-Foot*, &c. The Earliest *Blossomes* are, the *Blossomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of such *Trees*, as haue much *Moisture*, either *Watry* or *Oylie*. And therefore *Crocus Vernus* also, being an *Herbe*, that hath an *Oylie Iuyce*, putteth forth early. For those also finde the *Sunne* sooner than the *Drier Trees*. The *Graines* are, first *Rye* and *Wheat*; Then *Oats* and *Barley*; Then *Pease* and *Beanes*. For though *Greene Pease* and *Beanes* be eaten sooner, yet the *Drie Ones*, that are vsed for *Horse-meat*, are ripe last; And it seemeth that the *Fatter Graine* cometh first. The Earliest *Fruits* are, *Stramberries*, *Cherries*, *Gooseberries*, *Cornans*; And after them, *Early Apples*, *Early Peares*, *Apricots*, *Rasps*; And after them *Damasins*, and most kinde of *Plums*, *Peaches*, &c. And the latest are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-Berries*, *Heps*, *Medlars*, *Sernices*, *Cornelians*, &c.

It is to be noted, that (commonly) *Trees* that ripen latest, blossom soonest: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it seemeth to be a *Worke* of *Prouidence*, that they blossom to soone; For otherwise, they could not haue the *Sunne* long enough to ripen.

There be *Fruits* (but rarely,) that come twice a yeare; as some *Peares*, *Stramberries*, &c. And it seemeth they are such, as abound with *Nourishment*; Whereby after one *Period*, before the *Sunne* waxeth too weake, they can endure another. The *Violet* also, amongst *Flowers*, cometh twice a Yeare; Especially the *Double white*; And that also

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in Confort,
touching the
Seasons in
which Plants
come forth.

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is a *Plant* full of Moisture. *Roses* come twice, but it is not without *Cutting*, as hath beene formerly said.

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In *Muscovia*, though the *Corne* come not vp, till late *Spring*, yet their *Haruest* is as Early as Ours. The Cause is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee see with vs, that if it bee a long *winter*, it is commonly a more *Plentifull Yeare*: And after those kinde of *winters* likewise, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the same time; Which troubleth the *Husbandman* many times; For you shall haue *Red Roses*, and *Damaske Roses*, come together; And likewise the *Haruest* of *Wheat* and *Barley*. But this happeneth euer, for that the Earlier stayeth for the Later; And not that the Later commeth sooner.

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There be diuers *Fruit-Trees*, in the *Hot Countries*, which haue *Blossomes*, and *Young Fruit*, and *Ripe Fruit*, almost all the *Yeare*, succeeding one another. And it is said, the *Orenge* hath the like with vs, for a great Part of *Summer*; And so also hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to haue so; But that either they want *Iuyce* to spend; Or they meet with the *Cold* of the *Winter*: And therefore this *Circle* of *Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

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Some *Herbs* are but *Annually*, and die, *Root* and all, once a *Yeare*; As *Borrage*, *Lettuce*, *Cucumbers*, *Musk-Melons*, *Basil*, *Tobacco*, *Mustard-Seed*, and all kinde of *Corne*; Some continue many *Yeeres*; As *Hyssope*, *Germander*, *Lauander*, *Fennell*, &c. The Cause of the *Dying* is double; The first is the *Tenderneffe* and *weaknesse* of the *seed*, which maketh the *Period* in a small time; As it is in *Borrage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of these are *Hot*. The other Cause is, for that some *Herbs* can worse endure *Cold*; As *Basill*, *Tobacco*, *Mustard-Seed*; And these haue (all) much *Heat*.

Experiments
in Consort,
touching the
Lasting of Herbs
and Trees.

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THE *Lasting* of *Plants* is most in those that are *Largest* of *Body*; As *Oaks*, *Elme*, *Chest-nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrary; For *Borage*, *Colewort*, *Pompions*, which are *Herbs* of the *Largest Size*, are of small *Durance*; Whereas *Hyssope*, *winter-Sauory*, *Germander*, *Thyme*, *Sage*, will last long. The Cause is, for that *Trees* last according to the *Strength*, and *Quantity* of their *Sap* and *Iuyce*: Being well munit by their *Barke* against the *Iniuries* of the *Aire*: But *Herbs* draw a *Weake Iuyce*; And haue a *Soft Stalke*; And therefore those amongst them which last longest, are *Herbs* of *Strong Smell*, and with a *Sticky Stalke*.

584

Trees that beare *Mast*, and *Nuts*, are commonly more lasting, than those that beare *Fruits*; Especially the *Moister Fruits*: As *Oakes*, *Beeches*, *Chest-nuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. last longer than *Apples*, *Peares*, *Plums*, &c. The Cause is, the *Fatnesse*, and *Oylineffe* of the *Sap*; Which euer wasteth lesse, than the more *watry*.

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Trees, that bring forth their *Leaues* late in the *Yeere*, and cast them likewise late, are more *lasting*, than those that sprout their *Leaues* Early, or

thed

shed them betimes. The Cause is, for that the late *Comming forth* sheweth a *Moisture* more fixed; And the other more loose, and more easily resolved. And the same Cause is, that *Wilde Trees* last longer than *Garden-Trees*; And in the same kinde, those whose *Fruit* is *Acide*, more than those whose *Fruit* is sweet.

Nothing procureth the *Lasting* of *Trees*, *Bushes*, and *Herbs*, so much, as often *Cutting*: For every *Cutting* causeth a *Renouation* of the *Iuyce* of the *Plant*; That it neither goeth so farre, nor riseth so faintly, as when the *Plant* is not *Cut*: Infomuch as *Annually Plants*, if you cut them seasonably, and will spare the use of them, and suffer them to come vp still young, will last more *Yeares* than one; As hath beene partly touched; Such as is *Lettuce*, *Purslane*, *Cucumber*, and the like. And for *Great Trees*, we see almost all *Over-growne Trees*, in *Church-yards*, or neare *Ancient Buildings*, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full Height.

Some *Experiment* would be made, how by *Art* to make *Plants* more *Lasting* than their ordinary Period; As to make a *Stalke* of *Wheat*, &c. last a whole year. You must euer presuppose, that you handle it so, as the *winter* killeth it not; For we speake only of *Prolonging* the *Naturall Period*. I conceiue, that the *Rule* will hold; That whatsoever maketh the *Herbe* come later, than at his time, will make it last longer time: It were good trie it, in a *Stalke* of *Wheat*, &c. set in the *Shade*, and encompassed with a *Case* of *wood*, not touching the *Straw*, to keepe out *Open Aire*.

As for the *Preseruatiō* of *Fruits*, and *Plants*, as well upon the *Tree*, or *Stalke*, as gathered, we shall handle it under the Title of *Conservation of Bodies*.

THE *Particular Figures* of *Plants*, we leaue to their *Descriptions*; But some few things, in generall, we will obserue. *Trees* and *Herbs*, in the *Growing forth* of their *Boughes* and *Branches*, are not *Figured*, and keepe no *Order*. The Cause is, for that the *Sap*, being restrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the *Bodies* of *Trees*, and *Stalkes* of *Herbs*;) till they begin to branch; And then, when they make an *Eruption*, they breake forth casually, where they finde best way, in the *Barke* or *Rinde*. It is true, that some *Trees* are more scattered in their *Boughes*; As *Sallow-Trees*, *warden-Trees*, *Quince-Trees*, *Medlar-Trees*; *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almost to odd; As the *Peare-Tree*, (which the *Criticks* will haue to borrow his name of *πῆρ*, *Fire*;) *Orange-Trees*, *Fir-Trees*, *Service-Trees*, *Lime-Trees*, &c. And some are more spread and broad; As *Beeches*, *Hornbeame*, &c. The rest are more indifferent. The Cause of *Scattering* the *Boughes*, is the *Hasty* breaking forth of the *Sap*; And therefore those *Trees* rise not in a *Body* of any Height; but branch neere the *Ground*. The Cause of the *Pyramis*, is the *Keeping in* of the *Sap*, long before it branch; And the spending of it when it beginneth to branch, by equall degrees. The

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in Consort,
touching the
seuerall Figures
of Plants.

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Spreading is caused by the *Carrying* vp of the *Sap*, plentifully, without Expence; And then putting it forth speedily, and at once.

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There bee diuers *Herbs*, but no *Trees*, that may be said to haue some kinde of Order, in the Putting forth of their *Leaues*: For they haue *Ioyns* or *Knuckles*, as it were Stops in their *Germination*; As haue *Gilly-Flowers*, *Pinkes*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The Cause whereof is, for that the *Sap* ascendeth vnequally, and doth (as it were) tire and stop by the way. And it seemeth, they haue some *Closenesse* and *Hardnesse* in their *Stalke*, which hindereth the *Sap* from going vp, vntill it hath gathered into a Knot, and so is more vrged to put forth. And therefore, they are most of them hollow, when the *Stalke* is drie. As *Fennell-Stalke*, *Stubble*, and *Canes*.

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Flowers haue (all exquisite *Figures*; And the *Flower-Numbers*, are (chiefly) *Fiue*, and *Foure*; As in *Prime-Roses*, *Brier-Roses*, *Single-Musk-Roses*, *Single-Pinkes*, and *Gilly-Flowers*, &c. which haue fine *Leaues*: *Lillies*, *Flower-de-Luces*, *Borage*, *Buglosse*, &c. which haue foure *Leaues*. But some put forth *Leaues* not Numbred; But they are euer small Ones; As *Mary-Golds*, *Trifoile*, &c. Wee see also, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the *Fiue Brethren* of the *Rose*; *Sockets* of *Gilly-Flowers*, &c. *Leaues* also are all *Figured*; Some Round, Some Long; None Square; And many iagged on the Sides; Which *Leaues* of *Flowers* seldome are. For I account the iagging of *Pinkes*, and *Gilly-Flowers*, to be like the Inequality of *Oake-Leaues*, or *Vine-Leaues*, or the like; But they seldome or neuer haue any small *Purles*.

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in Consort
touching some
Principall Differences
in Plants.

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OF *Plants*, some few put forth their *Blossomes* before their *Leaues*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But most put forth some *Leaues* before their *Blossomes*; As *Apples*, *Peares*, *Plums*, *Cherries*, *White-Thorne*, &c. The Cause is, for that those, that put forth their *Blossomes* first, haue either an *Acute* and *Sharpe Spirit*; (And therefore commonly they all put forth early in the Spring, and ripen very late; As most of the Particulars before mentioned;) Or else an *Oily Iuyce*, which is apt to put out *Flowers*, than *Leaues*.

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Of *Plants*, some are *Greene* all *winter*; Others cast their *Leaues*. There are *Greene* all *winter*, *Holly*, *Iuy*, *Box*, *Firre*, *Eugh*, *Cypresse*, *Iuniper*, *Bayes*, *Rose-Mary*, &c. The Cause of the Holding *Greene*, is the Close and Compact *Substance* of their *Leaues*, and the *Pedicles* of them. And the Cause of that againe, is either the *Tough*, and *Viscous Iuyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the first Sort is *Holly*; Which is of so *Viscous a Iuyce*, as they make *Bird-lime* of the *Barke* of it. The *Stalke* of *Iuy* is *Tough* and not *Fragile*, as we see in other small *Twigs* dry. *Firre* yeeldeth *Pitch*. *Box* is a fast and heavy *wood*, as we see it in *Bowles*. *Eugh* is a Strong and *Tough wood*, as we see it in *Bowes*. Of the second Sort is *Iuniper*, which is a *wood* *Odorate*, and maketh a hot *Fire*. *Bayes* is likewise a Hot and *Aromaticall wood*; And so is *Rose-Mary* for a *Shrub*. As for the *Leaues*, their *Density* appeareth, in that, either they are *Smooth* and

and Shining, as in *Bayes*, *Holly*, *Box*, &c. Or in that they are Hard and Spiry, as in the rest. And Tryall would be made of *Grafting* of *Rose-Mary*, and *Bayes*, and *Box*, vpon a *Holly-Stocke*; Because they are *Plants* that come all *Winter*. It were good to trie it also with *Grafts* of other *Trees*, either *Fruit Trees*, or *Wilde Trees*; to see whether they will not yeeld their *Fruit*, or beare their *Leaves*, later, and longer in the *Winter*; because the *Sap* of the *Holly* putteth forth most in the *Winter*. It may be also a *Mezerion-Tree*, grafted vpon a *Holly*, will proue both an *Earlier*, and a *Greater Tree*.

There be some *Plants*, that beare no *Flowers*, and yet beare *Fruit*: There be some, that beare *Flowers*, and no *Fruit*. There be some that beare neither *Flowers*, nor *Fruit*. Most of the great *Timber-Trees*, (as *Oakes*, *Beeches*, &c.) beare no apparent *Flowers*. Some few (likewise) of the *Fruit-Trees*, As *Mulberry*, *Wal-nut*, &c. And some *Shrubs*, (as *Juniper*, *Holly*, &c.) beare no *Flowers*. Diuers *Herbs* also beare *Seeds*, (which is as the *Fruit*,) and yet beare no *Flowers*: As *Purslane*, &c. Those that beare *Flowers* and no *Fruit*, are few; As the *Double Cherry*, the *Sallow*, &c. But for the *Cherry*, it is doubtfull, whether it be not by *Art*, or *Culture*; For if it be by *Art*, then *Triall* would be made, whether *Apples*, and other *Fruits* *Blossomes*, may not be doubled. There are some Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars*, *Box*, *Brakes*, &c.

There be some *Plants*, that shoot still vpwards, and can *Support* themselves; As the greatest Part of *Trees* and *Plants*: there be some Other, that *Creepe* along the *Ground*: Or *Winde* about other *Trees*, or *Props*, and cannot support themselves; As *Vines*, *Iuy*, *Briar*, *Briony*, *Wood-bines*, *Hops* *Climatis*, *Camomill*, &c. The *Cause* is, (as hath beene partly touched,) for that all *Plants* (naturally) moue vpwards; But if the *Sap* put vp too fast, it maketh a slender *Stalke*, which will not support the weight: And therefore these latter Sort are all *Swift* and *Hasty* *Commers*.

THe first and most Ordinary *Helpe* is *Stercoration*. The *Sheeps-Dung* is one of the best; And next, the *Dung* of *Kine*: And thirdly, that of *Horses*: Which is held to be somewhat too hot, vnlesse it be mingled. That of *Pigeons* for a *Garden*, or a small *Quantity* of *Ground*, excelleth. The *Ordering* of *Dung* is, If the *Ground* be *Arable*, to spread it immediately before the *Plowing* and *Sowing*; And so to *Plow* it in: For if you spread it long before, the *Sunne* will draw out much of the *Fatnesse* of the *Dung*: If the *Ground* be *Grazing Ground*, to spread it somewhat late, towards *Winter*; that the *Sunne* may haue the lesse *Power* to drie it vp. As for speciall *Composts* for *Gardens*, (as a *Hot Bed*, &c.) wee haue handled them before.

The Second Kind of *Compost*, is, the *Spreading* of diuers *Kinds* of *Earths*. As *Marle*, *Chalke*, *Sea-Sand*, *Earth* vpon *Earth*, *Pond-Earth*, And the *Mixtures* of them. *Marle* is thought to be the best; As hauing most *Fatnesse*, And

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Manner of
Composts, and
Helps of Ground.

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And not Heating the *Ground* too much. The next *Sea-Sand*, Which (no doubt) obtaineth a speciall Vertue, by the *Salt*: For *Salt* is the first Rudiment of life. *Chalke* ouer-heateth the *Ground* a little. And therefore is best vpon *Gold Clay-Grounds*, or *Moist Grounds*: But I heard a great *Husband* say, that it was a common Errour to think that *Chalke* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Grasse*, as well as *Corne*: But that which breedeth the Errour is, because after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Rest; And then (indeed) afterward it will beare little *Grasse*, because the *Ground* is tired out. It were good to trie the laying of *Chalke* vpon *Arable Grounds*, a little while before *Plowing*; And to *Plow* it in, as they doe the *Dung*; But then it must be Friable first, by *Raine*, or *Lying*: As for *Earth*, it *Compasseth* it Selfe; For I knew a *Great Garden*, that had a *Field* (in a manner) powred vpon it; And it did beare *Fruit* excellently the first yeare of the *Planting*: For the *Surface* of the *Earth* is euer the *Fruitfullest*. And *Earth* so prepared hath a double *Surface*. But it is true, as I conceiue, that such *Earth*, as hath *Salt Petre* bred in it, if you can procure it without too much charge, doth excell. The way to hasten the *Breeding* of *Salt-Petre*, is to forbid the *Sunne*, and the *Growth* of *Vegetables*. And therefore if you make a large *Houell*, thatched, ouer some *Quantity* of *Ground*; Nay if you doe but *Plancke* the *Ground* ouer, it will breed *Salt-Petre*. As for *Pond Earth*, or *Riuer Earth*, it is a very good *Compost*; Especially if the *Pond* haue beene long vncleanfed, and so the *water* bee not too *Hungry*: And I Iudge it will be yet better, if there be some *Mixture* of *Chalke*.

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The Third *Helpe* of *Ground*, is, by some other *Substances*, that haue a Vertue to make *Ground* Fertile, though they bee not meere *Earth*: wherein *Ashes* Excell; In so much as the *Countries* about *Aetna*, and *Vesunius*, haue a kinde of *Amends* made them, for the *Mischiefe* the *Eruptions* (many times) doe, by the exceeding *Fruitfulnessse* of the *Soyle*, caused by the *Ashes*, scattered about. *Soot* also, though thin spred, in a *Field*, or *Garden*, is tried to bee a very good *Compost*. For *Salt*, it is too Costly: But it is tried, that mingled with *Seed-Corne*, and sown together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed-Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all ouer. As for the *Sceping* of the *Seeds*, in seuerall *Mixtures* with *Water*, to giue them Vigour; Or *Watring* *Grounds* with *Compost-water*; We haue spoken of them before.

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The Fourth *Helpe* of *Ground*, is, the *Suffering* of *Vegetables* to die into the *Ground*; And so to Fatten it; As the *Stubble* of *Corne*, Especially *Pease Brakes* cast vpon the *Ground*, in the Beginning of *Winter*, will make it very *Fruitfull*. It were good (also) to try, whether *Leaves* of *Trees* swept together with some *Chalke* and *Dung* mixed, to giue them more Heart, would not make a good *Compost*: For there is nothing lost, so much as *Leaves* of *Trees*; And as they lye scattered, and without *Mixture*, they rather make the *Ground* *soure*, than otherwise.

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The Fifth *Helpe* of *Ground*, is *Heat* and *warmth*. It hath beene anciently practised to burne *Heath*, and *Ling*, and *Sedge*, with the vantage of the *Wind*, vpon the *Ground*: We see, that *warmth* of *wals* and *Enclosures*, mendeth *Ground*: We see also that *Lying open* to the *South*, mendeth *Ground*: We see againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *warmth*, as by their *Compost*: And it may be doubted, whether the *Couering* of the *Ground* with *Brakes*, in the Beginning of the *Winter*, (whereof we spake in the last *Experiment*,) helpeth it not, by reason of the *warmth*. Nay some very good *Husbands* doe suspect, that the *Gathering vp* of *Flints*, in *Flinty Ground*, and laying them on *Heapes*, (which is much vsed,) is no good *Husbandry*; For that they would keepe the *Ground warme*.

The Sixth *Helpe* of *Ground* is, by *watering*, and *Irrigation*; which is in two *Manners*: The one by *Letting in*, and *Shutting out waters*, at seasonable *Times*: For *water* at some *Seasons*, and with too long stay, doth good; But at some other *Seasons*, and with reasonable *Stay*, doth hurt. And this serueth only for *Meadowes*, which are along some *Riuer*. The other way is, to bring *water* from some *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in some long *Furrowes*; And from those *Furrowes*, drawing it trauerse to spread the *water*. And this maketh an excellent *Improuement*, both for *Corne* and *Grasse*. It is the richer, if those *Hanging Grounds* be fruitfull, because it washeth off some of the *Fatnesse* of the *Earth*: But howsoeuer it profiteth much. Generally, where there are great *Ouerflowes*, in *Fens*, or the like, the drowning of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cause* may be, for that it keepeth the *Ground warme*, and nourisheth it: But the *Fen-Men* hold, that the *Sewers* must be kept so, as the *water* may not stay too long in the *Spring*, till the *weeds* and *Sedge* be growne vp; For then the *Ground* will be like a *Wood*, which keepeth out the *Sunne*; And so continueth the *Wer*; Whereby it will neuer graze (to purpose) that yeare. Thus much for *Irrigation*. But for *Avoidances*, and *Draynings* of *water*, where there is too much, and the *Helps* of *Ground* in that kinde, we shall speake of them in another *Place*.

The Fifth Manner of Ground, is that which is hard and smooth. It hath beene such
only practised to bring Water, and Sedge, with the advantage of
the Wind, upon the Ground: Where, that way of Water and Sedge,
mended Ground: Where also that being open to the Sea, mended
Ground: Where againe that the Folding of Sedge helps Ground as well
by their way, as by their Compass: And it may be doubted, whether
the Carrying of the Ground with Sedge, in the Beginning of the Winter,
(whereof we speake in the last Experiment) helps in not by reason of
the warmth. Nay some very good Husband doe suspect that the Car-
rying up of Earth, in Winter Ground, and laying them on Heaps, (which
is much viced) is no good Husbandry: For that they would keep the
Ground warme.

The Sixth Manner of Ground, is by running Water, which is in
two Manners: The one by cutting in, and running on Water, as also
able Times: For water at some Seasons, and with the long stay, doth
good; But at some other Seasons, and with the long stay, doth hurt.
And this serueth only for Meadows, which are along some River. The
other way is, to bring water from some running Ground, where there
are Springs, into the lower Ground, carrying it in some long Furrow.
And from those Furrows, drawing it thence to spread in the water. And
this maketh an excellent improvement both for Corn and Grass. As
the richer, if the running Ground be fruitful, because it washeth on
some of the Fertility of the Earth: But howsoever it profiteth much
Generally, where there are great Overflows, in some of the like, the
flowing of them in the winter, maketh the summer following more
fruitfull: The Cause may be, for that it keepeth the Ground warme, and
nourisheth it: But the few-Measles, that the water must be kept to in
the winter may not stay too long in the Spring till the water and sedge be
growne up: For then the Ground will be like a Wood, which kee-
peth out the Sunne, And so continueth the Water, which
it will never graze (to purpose) that year. This much
for Furrows. But for Avoidance, and Draynes of
water, where there is too much, and the water
of Ground in that kinde, we shall speake
of them in another
Place.

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NATVRALL HISTORIE.

VII. Century.



LHe Differences betweene *Animate* and *Inanimate Bodies*, we shall handle fully vnder the Title of *Life*, and *Living Spirits*, and *Powers*. We shall therefore make but a brieft Mention of them in this Place. The Main Difference are two. All *Bodies* haue *Spirits*, and *Pneumaticall Parts* within them: But the Main Differences betweene *Animate* and *Inanimate*, are two: The first is, that the *Spirits of Things Animate*, are all Continued with themselves, and are Branched in *Veines*, and secret *Canales*, as *Bloud* is: And in *Living Creatures*, the *Spirits* haue not only *Branches*, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reside, and whereunto the rest doe resort: But the *Spirits* in things *Inanimate* are shut in, and cut off by the *Tangible Parts*; And are not peruious one to another; As *Aire* is in *Snow*. The Second Main Difference is, that the *Spirits of Animate Bodies*, are all in some degree, (more or lesse,) kindled and inflamed; And haue a fine *Commixture* of *Flame*, and an *Aeriall Substance*. But *Inanimate Bodies* haue their *Spirits* no whit Inflamed, or Kindled. And this Difference consisteth not in the *Heat* or *Coolenesse* of *Spirits*; For *Cloues* and other *Spices*, *Naphtha* and *Petroleum*, haue exceeding *Hot Spirits*, (hotter a great deale than *Oyle*, *Wax*, or *Tallow*, &c.) but not *Inflamed*. And when any of those *Weake* and *Temperate Bodies* come

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touching the
Affinities, and
Differences, be-
tweene Plants
and Inanimate
Bodies.

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to be Inflamed, then they gather a much greater Heat, than others haue *Vn-inflamed*; besides their *Light*, and *Motion*, &c.

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The *Differences*, which are *Secondary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it selfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They haue an *Accretion*, but no *Alimentation*. Thirdly, *Plants* haue a *Period of Life*; which *Inanimate Bodies* haue not. Fourthly, they haue a *Succession*, and *Propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

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The *Differences* betweene *Plants*, and *Metalls* or *Fossiles*, besides those foure before mentioned, (For *Metalls* I hold *Inanimate*), are these: First, *Metalls* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part aboue *Earth*, and part vnder *Earth*.

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There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metalls* both; *Corall* is one of the Nearest of both *Kindes*: Another is *Vitrioll*, for that is aptest to sprout with *Moisture*.

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Another speciall *Affinity* is betweene *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it dissolue it not in *Arefaction*) will in the end issue into *Plants*, or *Living Creatures* bred of *Putrefaction*. I account *Mosse*, and *Mushromes*, and *Agaricke*, and other of those kinds, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Flesh*, and *Fish*, and *Plants* themselues, and a number of other things, after a *Mouldinesse*, or *Rottenesse*, or *Corrupting*, they will fall to breed *Wormes*. These *Putrefactions*, which haue *Affinity* with *Plants*, haue this *Difference* from them; That they haue no *Succession* or *Propagation*, though they *Nourish*, and haue a *Period of Life*, and haue likewise some *Figure*.

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I left once, by chance, a *Citron* cut, in a close Roome, for three Summer-Moneths, that I was absent; And at my Returne, there were growne forth out of the Pith cut, *Tufts of Haires*, an Inch long, with little blacke Heads, as if they would haue beene some *Herbe*.

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in Consort,
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Affinities, and
Differences, of
Plants, and Li-
ving Creatures:
And the Consi-
ders and Parti-
cles of them.

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The *Affinities* and *Differences* betweene *Plants* and *Living Creatures*, are these that follow. They haue both of them *Spirits Continued*, and *Branched*, and also *Inflamed*: But first in *Living Creatures*, the *Spirits* haue a *Cell* or *Seat*, which *Plants* haue not; As was also formerly said: And secondly, the *Spirits* of *Living Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And these two are the *Radicall Differences*. For the *Secondary Differences*, they are as follow. First, *Plants* are all *Fixed* to the *Earth*; Whereas all *Living Creatures* are seuered, and of them- selues. Secondly, *Living Creatures* haue *Locall Motion*; *Plants* haue not. Thirdly, *Living Creatures* nourish from their *Vpper Parts*, by the *Mouth* chiefly; *Plants* nourish from below, namely from the *Roots*. Fourthly, *Plants* haue their *Seed* and *Seminall Parts* vppermost; *Living Creatures* haue

haue them lower-most: And therefore it was said, not elegantly alone; but Philosophically; *Homo est Planta inuersa*; Man is like a Plant turned upwards: For the Root in Plants, is as the Head in Living Creatures. Fifthly, Living Creatures haue a more exact Figure than Plants. Sixthly, Living Creatures haue more Diuersity of Organs within their Bodies, and (as it were) Inward Figures, than Plants haue. Seuenthly, Living Creatures haue Sense, which Plants haue not. Eighthly, Living Creatures haue Voluntary Motion, which Plants haue not.

For the Difference of Sexes in Plants, they are oftentimes by name distinguished; As Male-Piony, Female-Piony; Male-Rose-mary, Female-Rose-mary; He-Holly, She-Holly; &c. but Generation by Copulation (certainly) extendeth not to Plants. The neereſt approach of it, is betweene the Hee-Palme, and the Shee-Palme; which, (as they report,) if they grow neere, incline the One to the other: In so much as, (that which is more strange) they doubt not to report, that to keepe the Trees vp-right from Bending, they tie Ropes or Lines, from the one to the other, that the Contact might be enioyed by the Contact of a Middle Body. But this may be Faigned, or at least Amplified. Neuertheſſe, I am apt enough to thinke, that this ſame Binarium of a Stronger and a Weaker, like vnto Masculine and Feminine, doth hold in all Living Bodies. It is confounded ſometimes; As in ſome Creatures of Putrifaction, wherein no Markes of Diſtinction appeare: And it is doubled ſometimes; As in Hermaphrodites: But generally there is a Degree of Strength in moſt Species.

The Participles or Conſiners betweene Plants and Living Creatures; are ſuch chiefly, as are Fixed, and haue no Locall Motion of Remoue, though they haue a Motion in their Parts; Such as are Oyſters, Cockles, and ſuch like. There is a Fabulous Narration, that in the Northerne Countries, there ſhould be an Herbe that groweth in the likenefſe of a Lambe, and feedeth vpon the Graſſe, in ſuch ſort, as it will bare the Graſſe round about. But I ſuppoſe that the Figure maketh the Fable; For ſo we ſee, there be Bee Flowers, &c. And as for the Graſſe, it ſeemeth the Plant, hauing a great Stalke and Top, doth prey vpon the Graſſe, a good way about, by drawing the Iuyce of the Earth from it.

THe Indian Fig boweth his Roots downe ſo low, in one yeare, as of it ſelfe it taketh Root againe: And ſo multiplieth from Root to Root; Making of one Tree a kinde of Wood. The Cauſe is the Plenty of the Sap, and the Softneſſe of the Stalke, which maketh the Bough, being over-loaden, and not ſtiffely vpheld, weigh downe. It hath Leaues, as broad as a little Target; but the Fruit no bigger than Beanes. The Cauſe is, for that the continual Shade increaſeth the Leaues, and abateth the Fruit, which neuertheſſe is of a pleaſant Taſte. And that (no doubt) is cauſed, by the Suppleneſſe and Gentleneſſe of the Iuyce of that Plant, being that which maketh the Boughes alſo ſo Flexible.

It is reported by one of the Ancients, that there is a certaine Indian Tree,

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touching
Plants.

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Tree, hauing few, but very great, *Leaves*, three Cubits long, and two broad; And that the *Fruit*, being of good Taste, groweth out of the *Barke*. It may be, there be *Plants*, that powre out the *Sap* so fast, as they haue no leasure, either to diuide into many *Leaves*, or to put forth *Stalks* to the *Fruit*. With vs, *Trees* (generally) haue small *Leaves*, in comparison. The *Fig* hath the greatest; And next is the *Vine*, *Mulberry*, and *Sycamore*; And the Least, are those of the *willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaves* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Cole-wort*. The Cause is, (like to that of the *Indian Fig*.) the hasty and plentifull Putting forth of the *Sap*.

612

There be three things in vse for Sweetnesse; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce knowne, and little vsed. It is found in *Canes*: *Quere*, whether to the first *Knuckle*, or further vp? And whether the very *Bark* of the *Cane* it selfe do yeeld *Sugar* or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I haue heard from one, that was industrious in Husbandry, that the labour of the *Bee* is about the *wax*; And that he hath knowne in the beginning of *May*, *Honey Combs* empty of *Honey*; And within a fortnight, when the Sweet *Dewes* fall, filled like a *Cellar*. It is reported also by some of the *Ancients*, that there is a *Tree* called *Occhus*, in the Valleys of *Hyrkania*, that distilleth *Honey* in the *Mornings*. It is not vnlike, that the *Sap* and *Teares* of some *Trees*, may be sweet. It may be also, that some sweet luyces, fit for many vses, may be concocted out of *Fruits*, to the Thickness of *Honey*; or perhaps of *Sugar*; The likeliest are *Raisins* of the *Sunne*, *Figs*, and *Corrans*: The Meanes may be enquired.

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The *Ancients* report of a *Tree*, by the *Persian Sea*, vpon the *Shore-Sands*, which is nourished with the *Salt-Water*; And when the *Tide* ebbereth, you shall see the *Roots*, as it were bare without *Barke*, (being as it seemeth corroded by the *Salt*.) and grasping the *Sands* like a *Crab*, Which neuerthelesse beareth a *Fruit*. It were good to try some *Hard Trees*, as a *Seruire-Tree*, or *Fir-Tree*, by setting them within the *Sands*.

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There be of *Plants*, which they vse for *Garments*, these that follow. *Hempe*; *Flax*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make also *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous Matter* commonly; And sometimes the *Downe* that groweth aboue.

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They haue in some *Countries* a *Plant* of a *Rosie Colour*, which shutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of those *Countries* say is a *Plant* that *Sleepeth*. There be *Sleepers* enow then; For almost all *Flowers* doe the like.

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Some *Plants* there are, but rare, that haue a *Mossy* or *Downy Root*; And likewise that haue a number of *Threds*, like *Beards*; As *Mandrakes*; whereof *Witches* and *Impossours* make an vgly *Image*, giuing it the Forme of a *Face* at the *Top* of the *Root*, and leaue those *Strings* to make a broad *Beard* downe to the *Foot*. Also there is a Kinde of *Nard* in *Creet*, (being a Kinde of *Phu*) that hath a *Root* hairy, like a *Rough-Footed-Doves*

foot.

foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And I take it in the *Bulbous*, the Sap hastneth most to the Aire, and Sunne: In the *Fibrous*, the Sap delighteth more in the Earth, and therefore putteth downward: And the *Hirsute* is a Middle betweene both; That besides the Putting forth vpwards, and downwards, putteth forth in Round.

There are some *Teares of Trees*, which are kimbred from the *Beards of Goats*: For when the *Goats* bite and crop them, especially in the Mornings, the Dew being on, the *Teare* commeth forth, and hangeth vpon their *Beards*: Of this Sort is some kinde of *Ladanum*.

The *Irrigation* of the *Plaine-Tree* by *Wine*, is reported by the *Ancients*, to make it Fruitfull. It would be tried likewise with *Roots*; For vpon *Seeds* it worketh no great Effects.

The way to carry *Forraine Roots*, a long Way, is to vessell them close in *Earthen Vessels*. But if the *Vessels* be not very Great, you must make some Holes in the Bottome, to giue some refreshment to the *Roots*; Which otherwise (as it seemeth) will decay, and suffocate.

The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryest; And those Things, which are knowne to comfort other *Plants*, did make that more Sterill: For in *Showers* it prospered worst: It grew also amongst *Bushes* of other kindes, where commonly *Plants* doe not thrive: Neither did it loue the Sunne: There might be one *Cause* of all those Effects; Namely, the sparing Nourishment, which that *Plant* required. *Quere* how farre *Cassia*, which is now the Substitute of *Cinnamon*, doth participate of these Things.

It is reported by one of the *Ancients*, that *Cassia*, when it is gathered, is put into the *Skins* of *Beasts*, newly fleyed; And that the *Skin* Corrupting, and Breeding *Wormes*, the *Wormes* doe deuoure the *Pith* and *Marrow* of it, and so make it Hollow; But meddle not with the *Barke*, because to them it is bitter.

There were, in Ancient Time, *Vines*, of farre greater *Bodies*, than we know any; For there haue beene *Cups* made of them, and an *Image* of *Iupiter*. But it is like they were *wilde Vines*; For the *Vines*, that they vse for *Wine*, are so often Cut, and so much Digged and Dressed, that their Sap spendeth into the *Grapes*, and so the *Stalke* cannot increase much in *Bulke*. The *Wood* of *Vines* is very durable; without *Rotting*. And that which is strange, though no *Tree* hath the *Twigs*, while they are greene, so brittle, yet the *Wood* dried is extreme Tough; And was vsed by the *Captaines* of *Armies*, amongst the *Romans*, for their *Cudgels*.

It is reported, that in some Places, *Vines* are suffered to grow like *Herbs*, spreading vpon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make triall, whether *Plants* that vse to be borne vp by Props, will not put forth greater *Leaves*, and greater *Fruits*, if they belaid along the *Ground*; As *Hops*, *Iuy*, *Wood-bine*, &c.

Quinces, or *Apples*, &c. if you will keepe them long, drowne them in *Honey*; But because *Honey* (perhaps) will giue them a Taste Ouerluscious,

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lufhious, it were good to make Triall in Powder of Sugar; Or in Syrrup of *wine*, onely Boyled to Height. Both these would likewise be tried in *Orenges*, *Limons*, and *Pomgranats*; For the Powder of Sugar, and Syrrup of *wine*, will serue for more times than once.

625 The *Conservation* of *Fruit* would be also tried in *Vessels*, filled with *fine Sand*, or with Powder of *Chalke*; Or in *Meale* and *Flower*; Or in *Dust* of *Oake-wood*; Or in *Mill*.

626 Such *Fruits*, as you appoint for *Long Keeping*, you must gather before they be full *Ripe*; And in a *Faire* and *Dry Day*, towards *Noone*; And when the *wind* bloweth not *South*; And when the *Moone* is vnder the *Earth*; And in *Decrease*.

627 Take *Grapes*, and hang them in an *Emptie Vessell*, well Stopped; And set the *Vessell*, not in a *Cellar*, but in some dry *Place*; And it is said, they will last long. But it is reported by some, they will keepe better, in a *Vessell* halfe full of *Wine*, so that the *Grapes* touch not the *wine*.

628 It is reported, that the *Preseruing* of the *Salke*, helpeth to preserue the *Grape*; Especially if the *Stalke* be put into the *Pith* of *Elder*, the *Elder* not touching the *Fruit*.

629 It is reported by some of the *Ancients*, that *Fruit* put in *Bottles*, and the *Bottles* let downe into *Wells* vnder *Water*, will keepe long.

630 Of *Herbs* and *Plants*, some are good to eat Raw; As *Lettuce*, *Endiue*, *Purslane*, *Tarragon*, *Cresses*, *Cucumbers*, *Musk-Melons*, *Raddish*, &c. Others onely after they are *Boyled*, or haue *Passed the Fire*; As *Parsley*, *Clary*, *Sage*, *Parsnips*, *Turnips*, *Asparagus*, *Artichoakes*, (though they also being young are eaten *Raw*:) But a Number of *Herbs*, are not *Esculent* at all; As *worme-Wood*, *Grafse*, *Greene-Corne*, *Centory*, *Hyssope*, *Lawender*, *Balme*, &c. The *Causes* are, for that the *Herbs*, that are not *Esculent*, doe want the two *Tastes*, in which *Nourishment* resteth; Which are, *Eat*, and *Sweet*; And haue (contrariwise) *Bitter* and *Ouer-strong Tastes*, or a *Iuyce* so Crude, as cannot be ripened to the degree of *Nourishment*. *Herbs* and *Plants*, that are *Esculent* Raw, haue *Fatnesse*, or *Sweetnesse*, (as all *Esculent Fruits*;) Such are *Onions*, *Lettuce*, &c. But then it must bee such a *Fatnesse*, (for as for *Sweet Things*, they are in effect alwaies *Esculent*) as is not *Ouer-grosse*, and *Loading* of the *Stomach*, For *Pparsnips* and *Leeks* haue *Fatnesse*; But it is too *Grosse* and *Heany* without *Boyling*. It must be also in a Substance somewhat *Tender*; For we see *Wheat*, *Barley*, *Artichoakes*, are no good *Nourishment*, till they haue *Passed the Fire*; But the *Fire* doth ripen, and maketh them soft and tender, and so they become *Esculent*. As for *Raddish* and *Tarragon*, and the like, they are for *Condimentes*, and not for *Nourishment*. And euen some of those *Herbs*, which are not *Esculent*, are notwithstanding *Poculent*; As *Hops*, *Broome*, &c. *Quare* what *Herbs* are good for *Drinke*, besides the two aforenamed; For that it may (perhaps) ease the Charge of *Brewing*, if they make *Beere* to require lesse *Malt*, or make it last longer.

631 *Parts* fit for the *Nourishment* of *Man*, in *Plants*, are *Seeds*, *Roots*, and *Fruits*; But chiefly *Seeds*, and *Roots*. For *Leaues*, they giue no *Nourishment*.

ment, at all, or very little: No more doe *Flowers*, or *Blossomes*, or *Stalkes*. The Reason is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* consist of an *Oily* and *watry* Substance commixed,) have more of the *Oily Substance*; And *Leaves*, *Flowers*, &c. of the *watry*. And secondly, they are more *Concocted*; For the *Root*, which continueth ever in the *Earth*, is still *Concocted* by the *Earth*; And *Fruits*, and *Graines*, (wee see) are halfe a yeere, or more, in *Concocting*; Whereas *Leaves* are out, and Perfect in a Monerh.

Plants (for the most part) are more strong, both in *Taste*, and *Smell*, in the *Seed*, than in the *Leafe*, and *Root*. The Cause is, for that in *Plants*, that are not of a Fierce and Eager Spirit, the Vertue is increased by *Concoction*, and *Maturation*, which is ever most in the *Seed*; But in *Plants*, that are of a Fierce and Eager Spirit, they are stronger whilest the Spirit is enclosed in the *Root*; And the *Spirits* doe but weaken and dissipate, when they come to the *Aire*, and *Sunne*; As we see it in *Onions*, *Garlick*, *Dragon*, &c. Nay there be *Plants*, that haue their *Roots*, very Hot, and *Aromaticall*; And their *Seeds*, rather *Inspide*; As *Ginger*. The Cause is (as was touched before,) for that the *Heat* of those *Plants* is very Dissipable; which vnder the *Earth* is contained and held in; But when it comineth to the *Aire*, it exhalet.

The *Iuyces* of *Fruits* are either *Watry*, or *Oily*. I reckon amongst the *watry*, all the *Fruits* out of which *Drinke* is expressed; As the *Grape*, the *Apple*, the *Peare*, the *Cherry*, the *Pomgranate*, &c. And there are some others, which, though they be not in vse for *Drinke*, yet they appeare to be of the same *Nature*; As *Plummes*, *Seruices*, *Mulberries*, *Rasps*, *Orenges*, *Limons*, &c. And for those *Iuyces*, that are so fleshy, as they cannot make *Drinke* by Expression, yet (perhaps) they may make *Drinke* by Mixture of *water*;

Poculaq; admistis imitantur vitea Sorbis.

And it may bee *Heps* and *Brier Berries* would doe the like. Those that haue *Oily Iuyce*, are; *Oliues*, *Almonds*, *Nuts* of all sorts, *Pine Apples*, &c. And their *Iuyces* are all *Inflammable*. And you must obserue also, that some of the *watry Iuyces*, after they haue gathered Spirit, will Burne and Enflame; As *wine*. There is a Third Kind of *Fruit*, that is sweet, without either *Sharpnesse* or *Oylineesse*: Such as is the *Fig*, and the *Date*.

It hath beene noted, that most *Trees*, and specially those that beare *Mast*, are fruitfull but once in two yeeres. The Cause (no doubt) is, the Expencc of *Sap*; For many *Orchard-Trees*, well Cultured, will beare diuers yeeres together.

There is no *Tree*, which besides the *Naturall Fruit*, doth beare so many *Basturd-Fruits*, as the *Oake* doth: For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are *Inflammable*; And certaine *Oake-Berries*, sticking close to the *Body* of the *Tree*, without *Stalke*. It beareth also *Misseltoe*, though rarely. The Cause of all these may be, the *Closenesse* and *Solidnesse* of the *wood*, and *Pitch* of the *Oake*; Which maketh seuerall *Iuyces* finde seuerall *Eruptions*. And therefore,

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if you will deuise to make any *Super-Plants*, you must euer giue the *Sap* Plentifull Rising, and hard Issue.

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There are two *Excreescences* which grow vpon *Trees*; Both of them in the Nature of *Mushromes*: The one the *Romans* called *Boletus*; Which groweth vpon the *Roots* of *Oakes*; and was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agaricke*, (whereof we haue spoken before) which groweth vpon the *Tops* of *Oakes*; Though it be affirmed by some, that it groweth also at the *Roots*. I doe conceiue, that many *Excreescences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into some *Preternaturall Substance*.

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The greater part of *Trees* beare *Moft*, and *Best*, on the *Lower Boughes*; As *Oakes*, *Figs*, *wall-Nuts*, *Peares*, &c. But some beare *Best* on the *Top-Boughes*, As *Crabs*, &c. Those that beare *best* below, are such, as *Shade* doth more good to, than *Hurt*. For generally all *Fruits* beare *best* lowest; Because the *Sap* tireth not, hauing but a short *Way*: And therefore in *Fruits* spread vpon *walls*, the *Lowest* are the *Greatest*, as was formerly said; So it is the *Shade* that hindereth the *Lower Boughes*; Except it be in such *Trees*, as delight in *shade*; Or at least beare it well. And therefore, they are either *Strong Trees*, as the *Oake*; Or else they haue large *Leaves*, as the *walnut* and *Fig*; Or else they grow in *Pyramis*, as the *Pear*. But if they require very much *Sunne*, they beare *best* on the *Top*; As it is in *Crabs*, *Apples*, *Plums*, &c.

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There be *Trees* that beare *best* when they begin to bee *Old*; As *Almonds*, *Peares*, *Vines*, and all *Trees* that giue *Mast*. The *Cause* is, for that all *Trees* that beare *Mast* haue an *Oily Fruit*; And *Young Trees* haue a more *Watry Iuyce*, and lesse *Concocted*; And of the same kinde also is the *Almond*. The *Pear* likewise, though it be not *Oily*, yet it requirerh much *Sap*, and well *Concocted*; For we see it is a *Heavy Fruit*, and *Solid*; Much more than *Apples*, *Plummies*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *wine*, when it is *Old*; For that the *Iuyce* is better *Concocted*: And wee see that *Wine* is *Inflammable*; So as it hath a kinde of *Oylineffe*. But the most Part of *Trees*, amongst which are *Apples*, *Plummies*, &c. beare *best* when they are *Young*.

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There be *Plants*, that haue a *Milke* in them, when they are *Cut*; As *Figs*, *Old Lettuce*, *Sow-Thistles*, *Spurge*, &c. The *Cause* may be an *Inception* of *Putrefaction*; For those *Milkes* haue all an *Acrimony*; though one would thinke they should be *Lenitive*. For if you write vpon *Paper*, with the *Milke* of the *Fig*, the *Letters* will not be seene, vntill you hold the *Paper* before the *Fire*, and then they wax *Browne*; Which sheweth that it is a *Sharpe* or *Fretting Iuyce*: *Lettuce* is thought *Poysonous*, when it is so *Old*, as to haue *Milke*; *Spurge* is a kinde of *Poyson* in it *Selfe*; And as for *Sow-Thistles*, though *Coneyes* eat them, yet *Sheepe* and *Cattell* will not touch them; And besides the *Milke* of them, rubbed vpon *Warts*, in short time, weareth them away: Which sheweth the *Milke*

of

of them to be *Corosue*. We see also, that *wheat*, and other *Corne* sown, if you take them forth of the *Ground*, before they sprout, are full of *Milke*; And the Beginning of *Germination* is euer a Kinde of *Putrefaction* of the *Seed*. *Euphorbium* also hath a *Milke*, though not very white, which is of a great *Acrimony*. And *Saladine* hath a yellow *Milke*, which hath likewise much *Acrimony*; For it cleanseth the *Eyes*. It is good also for *Cataracts*.

Mushromes are reported to grow, as well vpon the *Bodies* of *Trees*, as vpon their *Roots*, or vpon the *Earth*: And especially vpon the *Oake*. The *Cause* is, for that *Strong Trees*, are towards such *Excrescences*, in the Nature of *Earth*; And therefore Put forth *Mosse*, *Mushromes*, and the like.

There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*; in the *Blade*, or *Eare*; Except it be the *Tree* that beareth *Sanguis Draconis*: Which groweth (chiefly) in the *Iland Soquotra*: The *Herbe Amaranthus* (indeed,) is *Red* all ouer; And *Brasill* is *Red* in the *Wood*: And so is *Red Sanders*. That *Tree* of the *Sanguis Draconis*, groweth in the forme of a *Sugar-loafe*. It is like, that the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For wee see that *Grapes* and *Pomegranats*, are *Red* in the *Iuyce*; but are *Greene* in the *Teare*: And this maketh the *Tree* of *Sanguis Draconis*, lesser towards the *Top*, Because the *Iuyce* hasteneth not vp, And besides it is very *Astringent*; And therefore of *Slow Motion*.

It is reported, that *Sweet Mosse*, besides that vpon the *Apple-Trees*, groweth likewise (sometimes) vpon *Poplars*; And yet (generally) the *Poplar* is a *Smooth Tree* of *Barke*, and hath little *Mosse*. The *Mosse* of the *Larix Tree* burneth also *Sweet*, and sparkleth in the *Burning*. *Quere* of the *Mosses* of *Odorate Trees*, As *Cedar*, *Cypres*, *Lignum Aloës*, &c.

The *Death* that is most without *Paine*, hath beene noted to be, vpon the *Taking* of the *Potion* of *Hemlock*, which inhumanity was the *Forme* of *Execution* of *Capitall Offenders* in *Athens*. The *Poyson* of the *Aspe*, that *Cleopatra* vsed, hath some affinity with it. The *Cause* is, for that the *Torments* of *Death* are chiefly raised by the *Strife* of the *Spirits*; And these *Vapours* quench the *Spirits* by *Degrees*, Like to the *Death* of an extreme *Old Man*. I conceive it is a lesse *Painfull* than *Opium*, because *Opium* hath *Parts* of *Heat* mixed.

There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are *Sweet* before they ripen, and after grow *Spicie*. And some neuer *Ripen* to be *Sweet*; As *Tamarinds*, *Berberries*, *Crabs*, *Sloes*, &c. The *Cause* is, for that the former Kinde haue much and subtile *Heat*, which causeth *Early Sweetnesse*; The latter haue a *Cold* and *Acide Iuyce*, which no *Heat* of the *Sunne* can sweeten. But as for the *Mirabolane*, it hath *Parts* of *Contrary Natures*; For it is *sweet*, and yet *Astringent*.

There be few *Herbs* that haue a *Salt Taste*; And contrariwise all *Bloud* of *Liuing Creatures* hath a *Saltnesse*: The *Cause* may be, for that *Salt*, though it be the *Rudiment* of *Life*, yet in *Plants* the *Originall Taste*

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remaineth not; For you shall haue them *Bitter, Sowre, Sweet, Biting*, but seldome *Salt*: But in *Living Creatures*, all those High *Tastes* may happen to be (sometimes) in the *Humours*, but are seldome in the *Flesh*, or *Substance*; Because it is of a more *Oily Nature*, which is not very *Susceptible* of those *Tastes*; And the *Saltneffe* it selfe of *Bloud*, is but a light, and secret *Saltneffe*: And euen among *Plants*, some doe participate of *Saltneffe*, as *Alga Marina*, *Sampire*, *Scuruy-Grasse*, &c. And they report, there is, in some of the *Indian-Seas*, a *Swimming Plant*, which they call *Salgazus*, spreading ouer the *Sea*; in such sort, as one would thinke it were a *Meadow*. It is certaine, that out of the *Ashes* of all *Plants*, they extract a *Salt*, which they vse in *Medicines*.

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It is reported by one of the *Ancients*, that there is an *Herb* growing in the *water*, called *Lincoftis*, which is full of *Prickles*: This *Herbe* putteth forth another small *Herbe* out of the *Leafe*; which is imputed to some *Moisture*, that is gathered betweene the *Prickles*, which *Putrified* by the *Sunne*, *Germinateth*. But I remember also I haue seene, for a great *Rarity*, one *Rose* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top gallants*.

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Barley, (as appeareth in the *Making*,) being steeped in *water* three dayes, and afterwards the *water* drained from it, and the *Barley* turned vpon a drie floare, will sprout, halfe an Inch long at least: And if it bee let alone, and not turned, much more; vntill the Heart be out. *Wheat* will doe the same. Try it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Viue*; For there it is of the old *Store*, for no *water* is added; But here it is nourished from the *Water*. The *Experiment* would be further driven; For it appeareth already, by that which hath been said, that *Earth* is not necessary to the first *Sprouting* of *Plants*; And we see that *Rose-Buds* set in *water*, will *Blow*: Therefore try whether the *Sprouts* of such *Graines* may not be raised to a further *Degree*: As to an *Herbe*, or *Flower*, with *water* only; Or some small *Commixture*, of *Earth*: For if they will, it should seeme by the *Experiments* before, both of the *Malt*, and of the *Roses*, that they will come far faster on in *water*, than in *Earth*: For the *Nourishment* is easilier drawne out of *water*, than out of *Earth*. It may giue some light also, that *Drinke* infused with *Flesh*, as that with the *Capon*, &c. wil nourish faster and easilier, than *Meat* and *Drinke* together. Try the same *Experiment* with *Roots*, as well as with *Graines*: as for Example, take a *Turnip*, and steepe it a while, and then dry it, and see whether it will sprout.

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Malt in the *Drenching* will swell; And that in such a manner, as after the *Putting forth* in *sprouts*, and the *drying* vpon the *Keele*, there will be gained at least a *Bushell* in eight, and yet the *Sprouts* are rubbed off; And there will be a *Bushell* of *Dust* besides the *Malt*: Which I suppose to be, not only by the loose, and open *Laying* of the *Parts*, but by some *Addition* of *Substance*, drawne from the *Water*, in which it was steeped.

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Malt gathereth a *Sweetneffe* to the *Taste*, which appeareth yet more in

in the Wort. The *Dulcoration* of Things is worthy to be tryed to the full; For that *Dulcoration* importeth a degree to *Nourishment*: And the Making of Things *Inalimentall*, to become *Alimentall*, may be an Experiment of great Profit, for Making new *Victuall*.

Most *Seeds* in the *Growing*, leaue their *Huske* or *Rinde* about the *Root*; But the *Onion* will carry it vp, that it will be like a Cap vpon the Top of the *Young Onion*. The Cause may be, for that the *Skin* or *Huske* is not easie to breake; As we see by the *Pilling* of *Onions*, what a Holding Substance the *Skin* is.

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Plants, that haue *Curled Leauers*, doe all abound with *Moisture*; Which commeth so fast on, as they cannot spread themselues *Plaine*, but must needs gather together: The Weakest Kind of *Curling* is *Roughnesse*; As in *Clary*, and *Burre*. The Second is *Curling* on the Sides; As in *Lettuce*, and *Young Cabbage*: And the Third is *Folding* into an *Head*; As in *Cabbage* full growne and *Cabbage-Lettuce*.

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It is reported, that *Firre*, and *Pine*, especially if they be *Old* and *Putrified*, though they shine not, as some *Rotten Woods* doe, yet in the sudden *Breaking* they will sparkle like *Hard Sagar*.

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The *Roots* of *Trees* doe (some of them,) put downewards deepe into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Surface* of the *Earth*, As the *Ash*, *Cypresse-Tree*, *Olive*, &c. The Cause of this latter may be, for that such *Trees* as loue the *Sunne*, doe not willingly descend farre into the *Earth*; And therefore thy are (commonly) *Trees*, that shoot vp much; For in their *Body*, their desire of Approach to the *Sunne*, maketh them spread the lesse. And the same Reason vnder *Ground*, to auoid Recess from the *Sunne*, maketh them spread the more. And we see it commeth to passe in some *Trees*, which haue beene planted too deepe in the *Ground*, that for loue of Approach to the *Sunne*, they forsake their first *Root*, and put out another more towards the *Top* of the *Earth*. And wee see also, that the *Olive* is full of *Oily Iuyce*; And *Ash* maketh the best *Fire*; And *Cypresse* is an *Hot Tree*. As for the *Oake*, which is of the former sort, it loueth the *Earth*; And therefore groweth slowly. And for the *Pine*, and *Firre* likewise, they haue so much *Heat* in themselues, as they need lesse the *Heat* of the *Sunne*. There be *Herbs* also, that haue the same difference; As the *Herbe* they call *Morsus Diaboli*; which putteth the *Root* downe so low, as you cannot pull it vp without *Breaking* which gaue Occasion to the *Name*, and *Fable*; For that it was said, it was so wholesome a *Root*, that the *Deuill*, when it was gathered, bit it for *Envy*: And some of the *Ancients* doe report, that there was a *Goodly Firre*, (which they desired to remoue whole,) that had a *Root* vnder *Ground* eight Cubits deepe; And so the *Root* came vp broken.

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It hath beene obserued, that a *Branch* of a *Tree*, being *Vnbarked* some space at the *Bottome*, and so set into the *Ground*, hath growen, Euen of such *Trees*, as if the *Branch* were set with the *Bark* on, they would not grow; yet contrariwise we see, that a *Tree* Pared round in the *Body*, about the *Ground*,

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Ground, will die. The Cause may be, for that the *Vnbarkt Part* draweth the Nourishment best, but the *Barke* continueth it only.

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Grapes will continue *Fresh*, and *Moist*, all Winter long, if you hang them, *Cluster by Cluster*, in the *Roofe* of a *warne Roome*; Especially, if when you gather the *Cluster*, you take off with the *Cluster* some of the *Stocke*.

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The *Reed* or *Cane* is a *watry Plant*, and groweth not but in the *water*; It hath these Properties; that it is *Hollow*; That it is *Knuckled* both *Stalke*, and *Root*; That being *Drie*, it is more *Hard* and *Fragile*, than other *wood*; That it putteth forth no *Boughes*, though many *Stalkes* come out of one *Root*. It differeth much in *Greatnesse*; The smallest being fit for *Thatching* of *Houses*; And *Stopping* the *Chinkes* of *Ships*; Better than *Glew*, or *Pitch*. The Second *Bignesse*, is vsed for *Angle-Rods*, and *Staues*; And in *China* for beating of *Offenders* vp. on the *Thighes*. The differing *Kinder* of them are; The *Common Reed*; The *Cassia Fistula*; And the *Sugar-Reed*. Of all *Plants*, it boweth the easiest, and riseth againe. It seemeth, that amongst *Plants*, which are nourished with *Mixture* of *Earth* and *water*, it draweth most Nourishment from *Water*; which maketh it the *Smoothest* of all others in *Barke*; And the *Hollowest* in *Body*.

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The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *watry* and *Cleare*; As that of *Vines*; of *Beeches*; of *Peares*. Some *Thicke*; As *Apples*. Some *Gummy*; As *Cherries*. Some *Froathy*, As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* seemeth to be (almost) towards the *Barke* only; For if you cut the *Tree*, a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will be *drie*. The *Trees*, which haue the *Moistest Iuyces* in their *Fruit*, haue commonly the *Moistest Sap* in their *Body*; For the *Vines* and *Peares* are very *Moist*; *Apples* somewhat more *Spongie*: The *Milke* of the *Figge* hath the quality of the *Rennet*, to gather *Cheese*: And so haue certaine *Sowre Herbs* wherewith they make *Cheese* in *Leirr*.

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The *Timber* and *Wood* are, in some *Trees*, more *Cleane*, in some more *Knottie*: And it is a good *Triall*, to trie it by *Speaking* at one *End*, and *Laying* the *Eare* at the *Other*: For if it be *Knotty*, the *Voice* will not passe well. Some haue the *Veines* more varied, and chamlotted; As *Oake*, whereof *wainscot* is made; *Maple*, whereof *Trenchers* are made: Some more smooth, as *Firre*, and *walnut*: Some doe more easily breed *wormes* and *Spiders*; Some more hardly, as it is said of *Irish Trees*: Besides, there be a Number of Differences that concerne their vse; As *Oake*, *Cedar*, and *Chesnut*, are the best *Builders*: Some are best for *Plough-Timber*; As *Ash*: Some for *Peeres*, that are sometimes wet, and sometimes drie; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Deskes*; As *walnuts*: Some for *Ship-Timber*; As *Oaks* that grow in *Moist Grounds*; For that maketh the *Timber* *Tough*, and not apt to rift with *Ordinance*; Wherein *English* and *Irish Timber* are thought to excell: Some for *Masts* of *Ships*; As *Firre*, and *Pine*, because of their

Length

Length, Straightnesse, and lightnesse: Some for *Pale*; As *Oake*: Some for *Fuell*; As *Ash*: And so of the rest.

The *Comming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is sometimes *Casuall*: For many haue bene translated, and haue prospered well; As *Damaske-Roses*, that haue not bene knowne in *England* about an hundred yeares, and now are so common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meere *Naturall*; As the *Firre* and *Pine* loue the *Mountaines*; The *Poplar*, *Willow*, *Sallow*, and *Alder*, loue *Riuers*, and *Moist Places*: The *Ash* loueth *Coppices*; But is best in *Standards* alone: *Iuniper* loueth *Chalke*; And so doe most *Fruit-Trees*: *Sampire* groweth but vpon *Rockes*: *Reeds* and *Osfers* grow where they are washed with *Water*: The *Vine* loueth *Sides of Hills*, turning vpon the *South-East Sunne*, &c.

The *Putting forth* of certaine *Herbs* discovereth of what *Nature* the *Ground* where they put forth, is: As *Wilde Thyme* sheweth good *Feeding Ground* for *Cattell*: *Betony* and *Strawberries* shew *Grounds* fit for *Wood*: *Camomill* sheweth *Mellow Grounds* fit for *wheat*, *Mustard Seed*, growing after the *Plough*, sheweth a good *Strong Ground* also for *wheat*: *Barnet* sheweth good *Meadow*: And the like.

There are found, in diuers *Countries*, some other *Plants*, that grow out of *Trees* and *Plants*, besides *Misseltoe*: As in *Syria*, there is an *Herbe* called *Cassytas*, that groweth out of tall *Trees*, and windeth it selfe about the same *Tree* where it groweth; And sometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewise an *Herbe* called *Faunos*, vpon the *Wilde Olive*. And an *Herbe* called *Hippophaston* vpon the *Fullers Thorne*; Which, they say, is good for the *Falling-Sicknesse*.

It hath bene obserued, by some of the *Ancients*, that howsoeuer *Cold* and *Easterly Winds*, are thought to bee great *Enemies* to *Fruit*; yet neuerthelesse *South-winds* are also found to doe *Hurt*; Especially in the *Blossoming* time; And the more, if *Showers* follow. It seemeth they call forth the *Moisture* too fast. The *West-winds* are the best. It hath bene obserued also that *Greene* and *Open winters* doe hurt *Trees*; In so much as if two or three such *winters* come together, *Almond-Trees*, and some other *Trees*, will dye. The *Cause* is the same with the former, because the *Lust* of the *Earth* ouerspendeth it selfe; Howsoeuer some other of the *Ancients* haue commended *warme winters*.

Snowes, lying long, cause a *Fruitfull Teare*: For first, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) sucke the *Water*, as out of the *Teate*. Thirdly, the *Moisture* of *Snow* is the finest *Moisture*; For it is the *Broth* of the *Cloudy waters*.

Showers, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moist Fruits*; As *Vines*, *Olines*, *Pomegranates*; Yet it is rather for *Plentie*, than for *Goodnesse*; For the best *Wines* are in the *Driest Vinages*: *Small Showers* are likewise good for *Corne*, so as

Parching

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Parching Heats come not vpon them. Generally, *Night-Showers* are better than *Day-Showers*; For that the *Sunne* followeth not so fast vpon them: And wee see, euen in *Watring* by the *Hand*, it is best, in *Summer* time, to water in the *Euening*.

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The *Differences* of *Earths*, and the *Trial* of them, are worthy to be diligently inquired. The *Earth*, that with *Showers* doth easiliest *Soft*, is commended; And yet some *Earth* of that kinde will bee very *Dry*, and *Hard* before the *Showers*. The *Earth* that casteth vp from the *Plough*, a *Great Clod*, is not so good, as that which casteth vp a *Smaller Clod*. The *Earth*, that putteth forth *Mosse* easily, and may be called *Mouldy*, is not good. The *Earth*, that smelleth well vpon the *Digging*, or *Plowing*, is commended; As containing the *Iuyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-Bowes*, fall more vpon one kinde of *Earth* than vpon another: As it may well bee; For that that *Earth* is most *Roside*; And therefore it is commended for a *Signe* of good *Earth*. The *Poorenesse* of the *Herbs*, (it is plaine,) shew the *Poorenesse* of the *Earth*; And especially if they be in *Colours* more darke: But if the *Herbs* shew *withered*, or *Blasted* at the *Top*, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossinesse* of *Trees*. The *Earth*, whereof the *Grasse* is soone *Parched* with the *Sunne*, and *Toasted*, is commonly *Forced Earth*, and *Barren* in his owne Nature. The *Tender*, *Chefsome*, and *Mellow Earth*, is the best; Being meere *Mould*, betweene the two *Extremes* of *Clay*, and *Sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Plowed*, is commonly *Fruitfull*; For it is *Cleaving*, and full of *Iuyce*.

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It is strange, which is obserued by some of the *Ancients*, that *Dust* helpeth the *Fruitfulnessse* of *Trees*; And of *Vines*, by name; In so much as they cast *Dust* vpon them of purpose. It should seeme, that that *Powdring*, when a *Shower* commeth, maketh a kinde of *Soyling* to the *Tree*, being *Earth* and *water*, finely laid on. And they note, that *Countries*, where the *Fields* and *wayes* are *Dusty*, beare the best *Vines*.

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It is commended by the *Ancients*, for an *Excellent Helpe* to *Trees*, to lay the *Stalkes* and *Leaves* of *Lupines* about the *Roots*; Or to *Plow* them into the *Ground*, where you will sow *Corne*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them vpon *land*, doth much *Good*. And it was generally receiued of old, that the *Dunging* of *Grounds*, when the *West-Wind* bloweth, and in the *Decrease* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more *thirstie*, and open, to receiue the *Dung*.

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The *Grafting* of *Vines* vpon *Vines*, (as I take it,) is not now in vse: The *Ancients* had it, and that three wayes: The first was *Insition*, which is the Ordinary Manner of *Grafting*: The Second was *Terebration*, thorow the *Middle* of the *Stocke*, and *Putting* in the *Cions* there: And the Third was *Paring* of two *Vines*, that grow together, to the *Marrow* and *Binding* them close.

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The *Diseases* and ill *Accidents* of *Corne*, are worthy to bee enquired; And

And would be more worthy to be enquired, if it were in Mens Power to helpe them; Whereas many of them are not to be remedied. The *Mildew* is one of the Greatest; which (out of question) commeth by *Clovenesse* of *Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it seldome commeth; Such as is with vs *York's weald*. This cannot be remedied, otherwise than that in *Countries* of Small Enclosure, the *Grounds* bee turned into larger *Fields*: Which I haue knowen to doe good in some *Farmes*. Another *Disease* is the *Putting forth* of *wilde Oats*, whereinto *Corne* oftentimes, (especially *Barley*) doth degenerate. It happeneth chiefly from the *weaknesse* of the *Graine* that is sown; For if it bee either too Old, or Mouldy, it will bring forth *wilde Oats*. Another *Disease* is the *Saciety* of the *Ground*; For if you sow one *Ground* still with the same *Corne*, (I meane not the same *Corne* that grew vpon the same *Ground*,) but the same *Kinde* of *Graine*; (As *wheat*, *Barley*, &c.) it will prosper but poorly: Therefore besides the *Resting* of the *Ground*, you must varie the *Seed*. Another ill *Accident* is, from the *winds*, which hurt at two times; At the *Flouring*, by *Shaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drouth*, at the *Spindling* of the *Corne*; Which with vs is rare; But in Hotter *Countries*, common: Infomuch as the Word, *Calamitas*, was first deriued from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Ouer-wet* at *Sowing-time*; which with vs breedeth much *Dearth*; Infomuch as the *Corne* neuer commeth vp; And (many times) they are forced to resow *Sommer-Corne*, where they sowed *winter-Corne*. Another ill *Accident* is *Bitter Frosts*, continued, without *Snow*, Especially in the Beginning of the *winter*, after the *Seed* is new Sown. Another *Disease* is *wormes*; which sometimes breed in the *Root*, and happen vpon Hot *Sunnes*, and *Showers*, immediately after the *Sowing*; And another *worme* breedeth in the *Eare* it Selfe; Especially when Hot *Sunnes* breake often out of *Clouds*. Another *Disease* is *weeds*; And they are such, as either Choake, and Ouer-shadow the *Corne*, and beare it downe; Or starue the *Corne*, and deceiue it of Nourishment. Another *Disease* is, *Ouer-Rancknesse* of the *Corne*; Which they vse to remedy, by *Mowing* it after it is come vp; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Haruest*. Another ill *Accident* is, if the *Seed* happen to haue touched *Oyle*, or any *Thing*, that is *Fat*; For those *Substances* haue an *Antipathy* with *Nourishment* of *Water*.

The Remedies of the Diseases of *Corne* haue beene obserued as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *wine*, is thought a *Preferuatiue*: The *Mingling* of *Seed-Corne* with *Asbes*, is thought to be good: The *Sowing* at the *wane* of the *Moon*, is thought to make the *Corne* sound: It hath not beene practised, but it is thought to bee of vse, to make some *Miscellane* in *Corne*; As if you sow a few *Beanes* with *wheat*, your *wheat* will be the better. It hath beene obserued, that the *Sowing* of *Corne* with *Houfleeke*, doth good. Though *Graine*, that

toucheth *Oile*, or *Fat*, receiveth hurt, yet the *Steeping* of it, in the *Dregs* of *Oile*, when it beginneth to *Putrifie*, (which they call *Amurca*,) is thought to assure it against *wormes*. It is reported also, that if *Corne* bee *Mowed*, it will make the *Graine* Longer, but *Emptier*, and having More of the *Huske*.

671 It hath beene noted, that *Seed* of a yeere-old, is the Best; And of two or three yeeres is Worse; And that which is more Old, is quite Barren; Though (no doubt) some *Seeds* and *Graines* last better than others. The *Corne*, which in the *Vanning* lieth lowest, is the best; And the *Corne*, which broken or bitten retaineth a little *Yellownesse*, is better than that which is very *White*.

672 It hath beene obserued, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furthest into the *Earth*; Inasmuch as it hath beene knowen to goe three Cubits deepe; And that it is the *Root* that continueth fit (longest) to be set againe, of any *Root* that groweth. It is a *Cold* and *Acide* *Herbe*, that (as it seemeth) loveth the *Earth*, and is not much drawn by the *Sunne*.

673 It hath beene obserued, that some *Herbs* like best, being watted with *Salt-water*; As *Radish*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended to some other *Herbs*; Especially such as are Strong; As *Tarragon*, *Mustard-Seed*, *Rocket*, and the like.

674 It is strange that is generally receiued, how some *Poysonous Beasts* affect *Odorate* and *wholesome Herbs*; As that the *Snake* loveth *Fennell*; That the *Toad* will be much under *Sage*; That *Frogs* will be in *Cinquefoile*. It maybe, it is rather the *Shade*, or other *Couerture*, that they take liking in, than the *Vertue* of the *Herbe*.

675 It were a Matter of great Profit, (saue that I doubt it is too Coniecturall to venture vpon,) if one could discern, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plentie*, or *Scarcitie*, by some *Signes* and *Prognosticks*, in the Beginning of the *Yeere*: For as for those, that are like to be in *Plentie*, they may be bargained for, vpon the *Ground*; As the Old Relation was of *Thales*; who to shew how easie it was for a *Philosopher* to be rich, when hee fore-saw a great *Plentie* of *Olines*, made a *Monopoly* of them. And for *Scarcitie*, Men may make Profit in keeping better the old Store. Long Continuance of *Snow* is beleeued to make a *Fruitfull Yeere* of *Corne*: An *Earlywinter*, or a verie *Latewinter*, a *Barren Yeere* of *Corne*: An *Open* and *Serene winter*, an ill *Yeere* of *Fruit*: These we haue partly touched before: But other *Prognosticks* of like Nature are diligently to be enquired.

676 There seeme to be, in some *Plants*, *Singularities*, wherein they differ from all Other; The *Oline* hath the *Oily Part*, only on the *Outside*; Whereas all other *Fruits* haue it in the *Nut*, or *Kernell*. The *Pirre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines* *Kernels*. The *Pomegranate* and *Pine-Apple* haue onely, amongst *Fruits*, *Graines* distinct in severall *Cells*. No *Herbs* haue *Curled Leanes*, but *Cabbage*, and *Cabbage-Lettuce*. None haue double *Leanes*, one belonging to the

the *Stalke*, another to the *Fruit* or *Seed*, but the *Artichoke*: No *Flower* hath that kinde of *Spread* that the *woodbine* hath. This may bee a large *Field* of *Contemplation*; For it sheweth that in the *Frame* of *Nature*, there is, in the *Producing* of some *Species*, a *Composition* of *Matter*, which happeneth oft; and may be much *diuersified*: In others, such as happeneth rarely, and admitteth little *Variety*: For so it is likewise in *Beasts*: *Dogs* haue a *Resemblance* with *wolves*, and *Foxes*; *Horses* with *Asses*; *Kine* with *Buffes*; *Hares* with *Conies*; &c. And so in *Birds*: *Kites* and *Kestrells* haue a *Resemblance* with *Hawkes*; *Common-Doves* with *Ring-Doves*, and *Turtles*; *Black-Birds* with *Thrushes* and *Maniffes*; *Crowes* with *Rauens*, *Dawes*, and *Choughs*, &c. But *Elephants*, and *Swine* amongst *Beasts*; And the *Bird* of *Paradise*, and the *Peacocke* amongst *Birds*; And some few others; haue scarce any other *Species*, that haue *Affinity* with them.

Wee leaue the *Description* of *Plants*, and their *Vertues*, to *Herbals*, and other like *Bookes* of *Naturall History*: Wherein *Mens* diligence hath beene great, euen to *Curiosity*: For our *Experiments* are only such, as doe euer ascend a *Degree*, to the *Deriuing* of *Causes*, and *Extracting* of *Axiomes*, which, wee are not ignorant, but that some, both of the *Ancient* and *Moderne Writers*, haue also laboured, But their *Causes*, and *Axiomes*, are so full of *Imagination*, and so infected with the old *Receiued Theories*, as they are meere *Inquinations* of *Experience*, and *Concoct* it not.

IT hath beene obserued, by some of the *Ancients*, that *Skins*, (especially of *Rams*;) newly pulled off, and applied to the *wounds* of *Stripes*, doe keepe them from *Swelling*, and *Exulcerating*; And likewise Heale them, and Close them vp; And that the *whitts* of *Egs* doe the same. The *Cause*, is a *Temperate Conglutination*; For both bodies are *Clammy*, and *Viscous*, and doe bridle the *Deflux* of *Humours* to the *Hurts*; without *Penning* them in too much.

YOU may turne (almost) all *Flesh* into a *Fatty Substance*, if you take *Flesh*, and cut it into *Peeeces*, and put the *Peeeces* into a *Glasse* conered with *Parchment*; And so let the *Glasse* stand six or seuen *Houres* in *Boyling Water*. It may be an *Experiment* of *Profit*, for *Making* of *Fat*, or *Grease* for many vses; But then it must be of such *Flesh* as is not *Edible*; As *Horses*; *Dogs*; *Beares*; *Foxes*; *Badgers*; &c.

IT is reported by one of the *Ancients*, that *New wine* put into *Vessels* well stopped, and the *Vessels* let downe into the *Sea*, will accelerate very much, the *Making* of them *Ripe* and *Portable*. The same would be tried in *Wort*.

Experiment
Solitary touching
Healing
of Wounds.

677

Experiment
Solitary touching
Fat diffused
in Flesh.

678

Experiment
Solitary touching
Ripening
of Drink before
the Time.

679

Experiment
Solitary tou-
ching *Pilosity*
and *Plumage*.

680

Beasts are more *Hairy* than *Men*; and *Savage Men* more than *Civil*; And the *Plumage* of *Birds* exceedeth the *Pilosity* of *Beasts*. The *Cause* of the Smoothness in *Men*, is not any Abundance of *Heat* and *Moisture*, though that indeed causeth *Pilosity*; But there is requisite to *Pilosity*, not so much *Heat* and *Moisture*, as *Excrementitious Heat* and *Moisture*: (For whatsoeuer assimilath, goeth not into the *Haire*:) And *Excrementitious Moisture* aboundeth most in *Beasts*, and *Men* that are more *Savage*. Much the same Reason is there of the *Plumage* of *Birds*; For *Birds* assimilate lesse, and exerce more than *Beasts*: For their *Excrements* are ever liquid, and their *Flesh* (generally) more dry: Besides, they have not *Instruments* for *Urine*; And so all the *Excrementitious Moisture* goeth into the *Feathers*: And therefore it is no Marvell, though *Birds* bee commonly better Meat than *Beasts*, because their *Flesh* doth assimilate more finely, and secerneth more subtilly. Again, the *Head* of *Man* hath *Haire* vpon the *first Birth*, which no other *Part* of the *Body* hath. The *Cause* may be *Want* of *Perspiration*: For much of the Matter of *Haire*, in the other *Parts* of the *Body*, goeth forth by *Insensible Perspiration*; And besides, the *Skull* being of a more solid Substance, nourisheth and assimilath lesse, and excerneth more: And so likewise doth the *Chinne*; We see also that *Haire* commeth not vpon the *Palms* of the *Hands*, nor *Soles* of the *Feet*; Which are *Parts* more *Perspirable*. And *Children* likewise are not *Hairy*, for that their *Skins* are more *Perspirable*.

Experiments
Solitary tou-
ching the
Quickness of
Motion in *Birds*.

681

Birds are of *Swifter Motion* than *Beasts*: For the *Flight* of many *Birds* is *Swifter*, than the race of any *Beasts*. The *Cause* is, for that the *Spirits* in *Birds*, are in greater Proportion, in comparison of the Bulke of their *Body*, than in *Beasts*: For as for the Reason that some giue, that they are partly Carried, whereas *Beasts* goe, that is Nothing; For by that Reason Swimming should be swifter, than Running: And that Kinde of *Carriage* also, is not without Labour of the *wing*.

Experiment
Solitary tou-
ching the differ-
ent Cleerenesse
of the *Sea*.

682

The *Sea* is *Clearer*, when the *North-wind* bloweth, than when the *South-wind*. The *Cause* is, for that *Salt-water* hath a little *Oyliness* in the *Surface* thereof; As appeareth in very Hot daies: And againe, for that the *Southerne Wind* relaxeth the *Water* somewhat; As no *water Boiling* is so Cleere as *Cold Water*.

Experiment
Solitary tou-
ching the differ-
ent Heats of
Fire and *Boiling*
Water.

683

Fire burneth *wood*, making it first *Luminous*; Then *Blacke* and *Brittle*; And lastly, *Broken* and *Incinerate*: *Scalding Water* doth none of these. The *Cause* is, for that by *Fire*, the *Spirit* of the *Body* is first *Refined*, and then *Emitted*, Whereof the *Refining*, or *Attenuation* causeth the *Light*; And the *Emission*, first the *Fragility*, and after the *Dissolution* into *Ashes*: Neither doth any other *Body* enter: But in *water* the *Spirit* of the *Body* is not *Refined* so much; And besides *Part* of the *water* entrieth; Which doth increase the *Spirit*, and in a degree extinguish it: Therefore we see

that

that *Hot Water* will quench *Fire*. And againe wee see, that in *Bodies*, wherein the *Water* doth not much enter, but only the *Heat* passeth, *Hot Water* worketh the Effects of *Fire*: As in *Egges Boyled*, and *Roasted*, (into which the water entreth not at all) there is scarce difference to be discerned; But in *Fruit*, and *Flesh*, whereinto the *Water* entreth, in some Part, there is much more difference.

THe Bottome of a *Vessell* of *Boyling Water*, (as hath beene obserued) is not very much *Heated*; So as men may put their hand vnder the *Vessell*, and remoue it. The *Cause* is, for that the *Moisture* of *Water*, as it quencheth *Coales*, where it entreth; So it doth allay *Heat*, where it toucheth: And therefore note well, that *Moisture* although it doth not passe thorow *Bodies*, without *Communication* of some *Substance*, (As *Heat* and *Cold* doe,) yet it worketh manifest Effects; not by Entrance of the *Boddy*, but by *Qualifying* of the *Heat*, and *Cold*; As wee see in this *Instance*: And we see likewise, that the *water* of *Things distilled* in *Water*, (which they call the *Bath*) differeth not much from the *water* of *Things Distilled* by *Fire*: We see also, that *Pewter-Dishes*, with *Water* in them, will not Melt easily; But without it, they will: Nay we see more, that *Butter*, or *Oyle*, which in themselves are *Inflammable*, yet by Vertue of their *Moisture*, will doe the like.

IT hath beene noted by the *Ancients*, that it is dangerous to Picke ones *Eare*, whilest he *Yawneth*. The *Cause* is, for that in *Yawning*, the *Inner Parchment* of the *Eare* is extended, by the *Drawing* in of the *Spirit*, and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly Drawne in, and then strongly Expelled.

IT hath beene obserued by the *Ancients*, that *Sneezing* doth cease the *Hiccough*. The *Cause* is, for that the *Motion* of the *Hiccough*, is a *Lifting* vp of the *Stomacke*; which *Sneezing* doth somewhat depresse, and diuert the *Motion* another way. For first we see that the *Hiccough* commeth of *Fulnesse of Meat*, (especially in *Children*) which causeth an *Extension* of the *Stomacke*: We see also, it is caused by *Acide Meats*, or *Drinkes*, which is by the *Pricking* of the *Stomacke*: And this *Motion* is ceased, either by *Diuerſion*, Or by *Detention* of the *Spirits*: *Diuerſion*, as in *Sneezing*; *Detention*, as we see *Holding* of the *Breath*, doth helpe somewhat to cease the *Hiccough*: And putting a Man into an earnest Study doth the like; As is commonly vsed: And *Vinegar* put to the *Nostrills*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhabiteth the *Motion* of the *Spirits*.

Looking against the *Sunne*, doth induce *Sneezing*. The *Cause* is, not the *Heating* of the *Nostrills*; For then the *Holding* vp of the *Nostrills* against the *Sunne*, though one *Wiske*, would doe it; But the *Drawing* downe of the *Moisture* of the *Braine*: For it will make the *Eyes* run with

Experiment
Solitary tou-
ching the Qua-
lification of Heat
by Moisture.

684

Experiment
Solitary tou-
ching Yawning.

685

Experiment
Solitary tou-
ching the Hic-
cough.

686

Experiment
Solitary tou-
ching Sneezing.

687

water; And the Drawing of *Moisture* to the *Eyes*, doth draw it to the *Nosthrils*, by *Motion of Consent*; And so followeth *Sneezing*; As contrariwise the *Tickling* of the *Nosthrils* within, doth draw the *Moisture* to the *Nosthrils*, and to the *Eyes* by *Consent*; For they also will *Water*. But yet it hath beene observed, that if one be about to *Sneeze*, the Rubbing of the *Eyes*, till they run with *Water*, will prevent it. Whereof the *Cause* is, for that the *Humour*, which was descending to the *Nosthrils*, is diuerted to the *Eyes*.

Experiment
Solitary touching the
Tenderneſſe of the
Teeth.

688

THe *Teeth* are mote, by *Cold Drinke*, or the like, affected, than the other *Parts*. The *Cause* is double: The One, for that the *Resistance* of *Bone* to *Cold*, is greater than of *Fleſh*; for that the *Fleſh* shrinketh, but the *Bone* resisteth, whereby the *Cold* becommeth more eager: The Other is, for that the *Teeth* are *Parts* without *Bloud*, Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore we see, that the *Sinnewes* are much affected with *Cold*; For that they are *Parts* without *Bloud*: So the *Bones* in Sharpe *Colds* wax *Brittle*; And therefore it hath beene scene, that all *Contuſions* of *Bones*, in *Hard weather*, are more difficult to Cure.

Experiment
Solitary touching the
Tongue.

689

IT hath beene noted, that the *Tongue* receiveth, more easily, *Tokens* of *Diseaſes*, than the other *Parts*; As of *Heats* within, which appeare most in the *Blackneſſe* of the *Tongue*. Again, *Pied Catſell* are spotted in their *Tongues*, &c. The *Cause* is (no doubt,) the *Tenderneſſe* of the *Part*; which thereby receiveth more easily all *Alterations*, than any other *Parts* of the *Fleſh*.

Experiment
Solitary touching the
Taſte.

690

WHen the *Mouth* is out of *Taſte*, it maketh Things taſte, sometimes *Salt*; Chiefly *Bitter*; And sometimes *Loathſome*; But neuer *Sweet*. The *Cause* is, the *Corrupting* of the *Moisture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathſome*; But *Sweet* neuer; For the rest are *Degrees* of *Corruption*.

Experiment
Solitary touching ſome
Prognosticks of
Peſtilentiall
Seasons.

691

IT was observed in the *Great Plague* of the laſt Yeare, that there were ſcene, in diuers *Ditches*, and low *Grounds* about *London*, many *Toads*, that had *Tailes*, two or three *Inches* long, at the least: Whereas *Toads* (uſually) haue no *Tailes* at all. Which argueth a great *Disposition* to *Fuſeſfaction* in the *Soile*, and *Aire*. It is reported likewise, that *Roots*, (ſuch as *Carreets*, and *Parſnips*,) are more *Sweet*, and *Lushious*, in *Infectious* Yeares, than in other Yeares.

Experiment
Solitary touching Speciall
Simples for
Medicines.

692

WHe *Phyſicians* ſhould with all diligence inquire, what *Simples* Nature yeeldeth, that haue extreme *Subtile Parts*, without any *Mordication*, or *Acrimony*: For they Undermine that which is *Hard*; They open that which is *Stopped*, And *Shut*; and they expell that which is *Offenſiue*, gently, without too much *Perturbation*. Of this Kinde are *Elder-Flowers*, which therefore are Proper for the *Stone*: Of this kinde

is

is the *Dwarfe-Pine*; which is Proper for the *Jaundies*: Of this kinde is *Harts-Horne*; which is Proper for *Agues*, and *Infections*: Of this kinde is *Piony*, which is Proper for *Stoppings* in the *Head*: Of this kind is *Fumitory*; which is Proper for the *Spleene*: And a Number of Others. Generally, diuers *Creatures* bred of *Putrifaction*, though they be somewhat loathsome to take, are of this kinde; As *Earth-wormes*, *Timber-Sowes*, *Snails*, &c. And I conceive, that the *Trochiscs* of *Vipers*, (which are so much magnified,) and the *Flesh* of *Snakes* some waies condited, and corrected, (which of late are growne into some Credit,) are of the same Nature. So the *Parts* of *Beasts* *Putrified*; (as *Castoreum*, and *Muske*, which haue extreme *Subtill Parts*;) are to be placed amongst them. We see also that *Putrifactions* of *Plants*, (as *Agaricke*, and *Iewes-Eare*;) are of greatest Vertue. The *Cause* is, for that *Putrifaction* is the Subtillest of all *Motions*, in the *Parts* of *Bodies*: And since we cannot take downe the *Lines* of *Living Creatures*, (which some of the *Paracelsians* say (if they could be taken downe,) would make vs *Immortall*;) the Next is for *Subtily* of *Operation*, to take *Bodies* *Putrified*; Such as may be safely taken.

I Thath beene obserued by the *Ancients*, that *Much Use* of *Venus* doth *Dimme* the *Sight*; And yet *Eunuchs*, which are vnable to generate, are (neuerthelesse) also *Dimme Sighted*. The *Cause* of *Dimnesse* of *Sight*, in the Former, is the *Expende* of *Spirits*: In the Latter, the *Over-moisture* of the *Braine*: For the *Over-moisture* of the *Braine* doth thicken the *Spirits* *Visual*, and obstructeth their *Passages*; As we see by the *Decay*, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurrerth as another *Cause*: wee see also that *Blindnesse* commeth by *Rheumes*, and *Cataracts*. Now in *Eunuchs*, there are all the Notes of *Moisture*; As the *Swelling* of their *Thighes*, the *Loosenesse* of their *Belly*, the *Smoothnesse* of their *Skinne*, &c.

The *Pleasure* in the *Act* of *Venus* is the greatest of the *Pleasures* of the *Senses*: The *Matching* of it with *Itch* is vnproper; though that also be *Pleasing* to the touch. But the *Causes* are *Profound*. First, all the *Organs* of the *Senses* qualifie the *Motions* of the *Spirits*; And make so many seuerall *Species* of *Motions*, and *Pleasures* or *Displeasures* thereupon, as there be *Diuersities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taste*, and *Smell*, are of seuerall frame; And so are the *Parts* for *Generation*. Therefore *Scaliger* doth well, to make the *Pleasure* of *Generation* a *Sixth Sense*; And if there were any other differing *Organs*, and *Qualified Perforations*, for the *Spirits* to passe; there would be more than the *Five Senses*: Neither doe we well know whether some *Beasts*, and *Birds*, haue not *Senses* that wee know not: And the very *Sent* of *Dogges* is almost a *Sense* by it selfe. Secondly, the *Pleasures* of the *Touch*, are greater and deeper than those of the other *Senses*; As wee see in *warming* vpon *Cold*; Or *Refrigeration* vpon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senses*; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits* *immediately*, and (as it were) without an

Organ.

Experiments
in Consort touching
Venus.

693

694

Organ is of the greatest *Pleasure*; Which is but in two things: *Sweet Smells*; And *wine*, and the like *Sweet Vapours*. For *Smells*, wee see their great and sudden Effect in fetching *Men* againe, when they swoone: For *Drinke*, it is certain, that the *Pleasure* of *Drunkennesse*, is next the *Pleasure* of *Venus*: And *Great Ioyes* (likewise) make the *Spirits* moue, and touch themselves: And the *Pleasure* of *Venus* is somewhat of the same Kind.

695

It hath beene alwaies obserued, that *Men* are more inclined to *Venus* in the *winter*, and *women* in the *Summer*. The Cause is, for that the *Spirits* in a *Body* more Hot and dry, (as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and dissipated; And in the *winter* more condensed, and kept entire: But in *Bodies* that are Cold and Moist, (as *womens* are,) the *Summer* doth Cherish the *Spirits*, and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abstinence*, or *Intermission* of the Use of *Venus*, in Moist and well Habituate *Bodies*, breedeth a Number of *Diseases*; And especiall dangerous *Impostumations*. The Reason is euident; For that it is a Principall *Euacuation*, especially of the *Spirits*: For of the *Spirits*, there is scarce any *Euacuation*, but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

Experiments
in Confort
touching the
Insecta.

The Nature of *Viufication* is very worthy the Enquiry: And as the Nature of *Things*, is commonly better perceiued, in Small, than in Great; and in vnperfect, than in perfect; and in Parts, than in whole: So the Nature of *Viufication* is best enquired in *Creatures* bred of *Putrefaction*. The Contemplation whereof hath many Excellent Fruits. First, in Disclosing the Originall of *Viufication*. Secondly, in Disclosing the Originall of *Figuration*. Thirdly, in Disclosing many *Things* in the Nature of *Perfect Creatures*, which in them lye more hidden. And Fourthly, in Traducing, by way of Operation, some *Observations* in the *Insecta*, to worke Effects vpon *Perfect Creatures*. Note that the word *Insecta*, agreeth not with the Matter, but we euer vse it for Breuities sake, intending by it *Creatures* bred of *Putrefaction*.

696

The *Insecta* are found to breed out of seuerall Matters: Some breed of *Mud* or *Dung*; As the *Earth-wormes*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth *Putrifie*, as not able to Preserve it selfe: And for *Dung*, all *Excrements* are the *Refuse* and *Putrefactions* of *Nourishment*. Some breed in *wood*, both *Growing*, and *Cut down*. Quere in what *woods* most, and at what *Seasons*? We see that the *worms* with many Feet, which round themselves into *Balls*, are bred chiefly vnder *Logs* of *Timber*, but not in the *Timber*; And they are said to be found also, (many times,) in *Gardens*, where no *Logs* are. But it seemeth their

Generation

Generation requireth a Couerture, both from *Sunne*, and *Raine*, or *Dew*; As the *Timber* is; And therefore they are not *Venomous*, but (contrariwise) are held by the *Physitians* to clarify the *Bloud*. It is obserued also that *Cimices* are found in the *Holes* of *Bed-sides*. Some breed in the *Haire* of *Liuing Creatures*; As *Lice*, and *Tikes*; which are bred by the *Sweat* close kept, and somewhat arefied by the *Haire*. The *Excrements* of *Liuing Creatures*, doe not only breed *Insecta*, when they are *Excerned*, but also while they are in the *Body*; As in *wormes*, whereto *Children* are most subiect, and are chiefly in the *Guts*. And it hath beene lately obserued by *Physitians*, that in many *Pestilent Diseases*, there are *wormes* found in the vpper *Parts* of the *Body*, where *Excrements* are not, but only *Humours Putrified*. *Fleas* breed principally of *Straw* or *Mats*, where there hath beene a little *Moisture*; Or the *Chamber* and *Bed-Straw* kept close and not *Aired*. It is receiued that they are killed by *Screwing wormewood* in the *Rooms*. And it is truly obserued, that *Bitter Things* are apt, rather to kil, than engender *Putrifaction*; And they be things that are *Fat* or *Sweet*, that are aptest to *Putrifie*. There is a *worme*, that breedeth in *Meale*, of the shape of a large white *Magget*, which is giuen as a great *Dainty* to *Nightingales*. The *Moath* breedeth vpon *Cloth*, and other *Lanifices*; Especially if they be laid vp dankish, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *worme* called a *weuill*, bred vnder *Ground*, and that feedeth vpon *Roots*; As *Parsnips*, *Carrets*, &c. Some breed in *waters*, especially shaded, but they must be *Standing-waters*; As the *water-Spider*, that hath six *Legs*. The *Fly* called the *Gad-fly*, breedeth of somewhat that *Swim* meth vpon the *Top* of the *Water*, and is most about *Ponds*. There is a *worme* that breedeth of the *Dregs* of *wine Decayed*; which afterwards, (as is obserued by some of the *Ancients*) turneth into a *Gnat*. It hath bin obserued by the *Ancients*, that there is a *worme* that breedes in old *Snow*, and is of *Colour Reddish*, and dull of *Motion*, and dieth soone after it commeth out of *Snow*. Which should shew, that *Snow* hath in it a secret *Warmth*; For else it could hardly *Viuijie*. And the Reason of the *Dying* of the *worme*, may be the sudden *Exhaling* of that little *Spirit*, as soone as it commeth out of the *Cold*, which had shut it in. For as *Butter-flies* quicken with *Heat*, which were benumbed with *Cold*; So *Spirits* may exhale with *Heat*, which were *Preserued* in *Cold*. It is affirmed both by *Ancient* and *Moderne Obseruation*, that in *Furnaces* of *Copper*, and *Brasse*, where *Chalcites* (which is *Vitrioll*.) is often cast in, to mend the working, there riseth suddenly a *Fly*, which sometimes moueth, as if it tooke hold on the walls of the *Furnace*; Sometimes is seene mouing in the *Fire* below; And dieth presently, as soone as it is out of the *Furnace*. Which is a Noble *Instance*, and worthy to be weighed; for it sheweth that as well *Violent Heat* of *Fire*, as the *Gentle Heat* of *Liuing Creatures*, will *Viuijie*, if it haue matter *Proportionable*. Now the great *Axiome* of *Viuisification* is, that there must be *Heat* to dilate the *Spirit* of the *Body*; An *Active Spirit* to be dilated; *Matter Viscous* or *Tenacious*, to hold in the *Spirit*; And that *Matter* to be put forth and *Figured*. Now a *Spirit* dilated by so ardent a

Fire,

Fire, as that of the *Furnace*, as soone as euer it cooleth neuer so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will put forth and germinate, as we see in *Chymicall* Trialls. Briefly, most *Things Putrified* bring forth *Insecta* of severall Names; But we will not take vpon vs now, to Enumerate them all.

697

The *Insecta* haue beene noted by the *Ancients*, to feed little: But this hath not beene diligently obserued; For *Grashoppers* eat vp the *Greene* of whole *Countries*; And *Silke-wormes* deuoure leaues swiftly; And *Ants* make great Prouision. It is true, that *Creatures*, that Sleep and rest much, Eat little; As *Dormise*, and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *Iuyce* of their *Bodies*, is almost all one; No *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integrall Parts* haue Extreme Varietie, but the *Similar Parts* little. It is true, that they haue, (some of them,) a *Diaphragme*, and an *Intestine*; And they haue all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of *Long Life*: Yet *Bees* haue beene knowne to liue teuen yeares: And *Snakes* are thought, the rather for the *Casting* of their *Spoile*, to liue till they be Old: And *Eeles*, which many times breed of *Putrifaction*, will liue and grow very long: And those that Enterchange from *wormes* to *Flies* in the *Summer*, and from *Flies* to *wormes* in the *Winter*, haue beene kept in Boxes foure years at the least. Yet there are certaine *Flies*, that are called *Ephemera*, that liue but a day. The *Cause* is, the Exility of the *Spirit*, Or perhaps the Absence of the *Sunne*, For that if they were brought in, or kept close, they might liue longer. Many of the *Insecta*, (as *Butterflies*, and other *Flies*,) reuiue easily, when they seeme deed, being brought to the *Sunne*, or *Fire*. The *Cause* whereof is, the *Diffusion* of the *Vitall Spirit*, and the *Easse Dilating* of it by a little *Heat*. They stirre a good while after their *Heads* are off, or that they be cut in *Peeces*, which is caused also, for that their *Vitall Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

698

The *Insecta* haue *Voluntary Motion*, and therefore *Imagination*; And whereas some of the *Ancients* haue said that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently obserued; For *Ants* goe rightly forwards to their *Hills*; And *Bees* doe (admirably) know the way, from a Flowry Heath, two or three Miles off, to their *Hiues*. It may be *Gnats*, and *Flies*, haue their *Imagination* more mutable and giddy, as *Small Birds* likewise haue. It is said by some of the *Ancients*, that they haue onely the *Sense of Feeling*; which is manifestly vntrue: For if they goe forth-right to a Place, they must needs haue *Sight*: Besides they delight more in one *Flower*, or *Herb*, than in another, and therefore haue *Taste*. And *Bees* are called with *Sound* vpon *Brasse*, and therefore they haue *Hearing*: Which sheweth likewise that though their *Spirit* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Obseruations concerning the *Insecta*, together with the Enumeration

tion

tion of them, we referre to that Place, where wee meane to handle the Title of Animal's in generall.

A Man Leapeth better with weights, in his Hands, than without. The Cause is, for that the weight, (if it be proportionable,) strengtheneth the Sinewes, by Contracting them. For otherwise, where no Contraction is needfull, weight hindereth. As we see in Horse-Races, Men are curious to fore-see, that there be not the least weight, vpon the one Horse, more than vpon the other. In Leaping with Weights, the Armes are first cast backwards, and then forwards, with so much the greater Force: For the Hands goe backward before they take their Raife. Quere, if the contrary Motion of the Spirits, immediately before the Motion wee intend, doth not cause the Spirits, as it were, to breake forth with more Force: As Breath also drawen, and kept in, commeth forth more forcibly: And in Casting of any Thing, the Armes, to make a greater Swing, are first cast backward.

Experiment
Solitary tou-
ching Leaping.
699

OF Musickall Tones, and Vnequall Sounds, wee haue spoken before; But touching the Pleasure, and Displeasure of the Senses, not so fully. Harsh Sounds, as of a Saw, when it is sharpened; Grinding of one Stone against another; Squeaking, or Skrieking Noise; make a Shiuering or Horrour in the Body, and set the Teeth on edge. The Cause is, for that the Objects of the Eare, doe affect the Spirits (immediately) most with Pleasure and Offence. We see, there is no Colour that affecteth the Eye much with Displeasure: There be Sightes, that are Horrible, because they excite the Memory of Things that are Odious, or Fearfull; But the same Things Painted doe little affect. As for Smells, Tastes, and Touches, they be Things that doe affect, by a Participation, or Impulsion of the Body, of the Object. So it is Sound alone, that doth immediately, and incorporeally, affect most: This is most manifest in Musicke; and Concords and Discords in Musicke: For all Sounds, whether they be sharpe, or Flat, if they be Sweet, haue a Roundnesse and Equalitie; And if they be Harsh, are Vnequall: For a Discord it selfe is but a Harshnesse of Diuers Sounds Meeting. It is true, that Inequality, not Stayed vpon, but Passing, is rather an Encrease of Sweetnesse; As in the purling of a wreathed String; And in the Raucitie of a Trumpet; And in the Nightingale-Pipe of a Regall; And in a Discord straight falling vpon a Concord: But if you stay vpon it, it is Offensue; And therefore, there be these three Degrees of Pleasing and Displeasing in Sounds; Sweet Sounds; Discords; and Harsh Sounds, which wee call by diuers Names, as Skrieking, or Grating, such as we now speake of. As for the Setting of the Teeth on Edge, we see plainly, what an Inter-
course there is, between the Teeth, and the Organ of the
Hearing, by the Taking of the End of a Bow,
betweene the Teeth, and Striking
vpon the String.

Experiment
Solitary tou-
ching the Plea-
sures, and Dis-
pleasures of the
Senses, especi-
ally of Hearing.
700



NATVRALL HISTORIE.

VIII. Century.



Here be *Minerals*, and *Fossiles*, in great Varie-
tie; But of *Veines of Earth Medicinall*, but
few; The chiefe are, *Terra Lemnia*, *Terra*
Sigillata communis, and *Bolus Arminus*:
Whereof *Terra Lemnia* is the Chiefe. The
Vertues of them are, for *Curing of wounds*,
Stanching of Bloud, *Stopping of Fluxes* and
Rheumes, and *Arresting the Spreading of*
Poyson, *Infection*, and *Putrifaction*: And they
haue, of all other *Simples*, the *Perfectedest* and
Purest Quality of Drying, with little or no *Mixture of any other Quality*.
Yet it is true, that the *Bolus Arminicke* is the most *Cold* of them; And that
Terra Lemnia is the most *Hot*: For which Cause, the *Island Lemnos*,
where it is digged, was in the Old *Fabulous Ages* consecrated to *Vulcan*.

A Bout the bottome of the *Straights* are gathered great *Quantities*
of *Sponges*, which are gathered from the sides of *Rockes*, being as it
were a large, but tough *Mosse*. It is the more to be noted, because that
there be but few *Substances*, *Plant-like*, that grow deep within the *Sea*; For
they are gathered sometimes fifteen *Fathom* deep; And when they are
laid

Experiment
Solitary tou-
ching *Veines*
of *Medicinall*
Earth.

701

Experiment
Solitary tou-
ching the
Growth of
Sponges.

702

laid on Shore, they seeme to be of great Bulke; But cruthed together, will be transported in a very small Room.

Experiment
Solitary tou-
ching Sea-Fish,
put in Fresh
Waters.

703

IT seemeth, that *Fish*, that are vsed to the *Salt-water*, doe neuerthe-
lesse delight more in *Fresh*. We see, that *Salmons*, and *Smelts*, loue to
get into *Riuers*, though it be against the *Streame*. At the *Hauen* of *Con-*
stantinople, you shall haue great *Quantities* of *Fish* that come from the
Euxine Sea; that when they come into the *Fresh water*, do inebriate and
turne vp their *Bellies*; So as you may take them with your Hand. I doubt
there hath not been sufficient *Experiment* made of Putting *Sea-Fish* into
Fresh-water, *Ponds*, and *Pooles*. It is a thing of great *Vse*, and *Pleasure*:
For so you may haue them new at some good distance from the *Sea*:
And besides, it may be, the *Fish* will eat the pleasanter, and may fall to
breed, And it is said, that *Colchester Oysters*, which are put into *Pits*,
where the *Sea* goeth and commeth (but yet so, that there is a *Fresh-wa-*
ter also comming to them, when the *Sea* voideth,) become by that
meanes *Fatter*, and more *Growne*.

Experiment
Solitary tou-
ching *Attraction*
by *Similitude*
of *Substance*.

704

THe *Turkish-Bow* giueth a very *Forcible Shoot*; Insomuch as it hath
bin known, that the *Arrow* hath pierced a *Steele Target*, or a *Peece*
of *Brasse* of two Inches thicke: But that which is more strange, the *Ar-*
row, if it be Headed with *wood*, hath beene knowne to pierce thorow a
Peece of *wood*, of eight Inches thicke. And it is certaine, that we had
in vse at one time, for *Sea-Fight*, short *Arrowes*, which they called
Sprights, without any other Heads, saue *wood* sharpned; which were
discharged out of *Muskets*, and would pierce thorow the sides of *Ships*,
where a *Bullet* would not pierce. But this dependeth vpon, one of the
greatest *Secrets* in all *Nature*; Which is, that *Similitude* of *Substance* will
cause *Attraction*, where the Body is wholly freed from the *Motion* of
Gravity: For if that were taken away, *Lead* would draw *Lead*, and *Gold*
would draw *Gold*, and *Iron* would draw *Iron*, without the helpe of the
Load-stone. But this same *Motion* of *weight* or *Gravity* (which is a meere
Motion of the *Matter*, and hath no *Affinity* with the *Forme* or *Kinde*,)
doth kill the other *Motion*, except it selfe be killed by a violent *Motion*,
As in these *Instances* of *Arrowes*; For then the *Motion* of *Attraction* by
Similitude of *Substance*, beginneth to shew it selfe. But we shall handle
this *Point* of *Nature* fully in due Place.

Experiment
Solitary tou-
ching certaine
Drinkes in *Tur-*
key.

705

They haue in *Turkey*, and the *East*, certaine *Confections*, which they
call *Seruets*, which are like to *Candied Conserues*; And are made of
Sugar and *Limons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and some
other *Flowers*; And some Mixture of *Amber* for the more delicate Per-
sons; And those they dissolue in *Water*, and thereof make their *Drinke*,
because they are forbidden *wine* by the *Law*. But I doe much maruell,
that no *Englishman*, or *Dutchman*, or *German*, doth set vp *Brewing* in *Con-*
stantinople; Considering they haue such *Quantity* of *Barley*. For as for
the

the generall Sort of Men, Frugality may be the Cause of Drinking Water; For that it is no small Saving, to pay nothing for ones *Drinke*: But the better Sort might well be at the Cost. And yet I wonder the lesse at it, because I see *France, Italy, or Spaine*, haue not taken into vse, *Beere, or Ale*; Which (perhaps) if they did, would better both their Healths, and their Complexions. It is likely it would be Matter of great Gaine to any, that should begin it in *Turkey*.

IN *Bathing in Hot water, Sweat* (neuerthelesse) commeth not in the *Parts vnder the water*. The Cause is; First, for that *Sweat* is a Kind of *Colliquation*. And that Kind of *Colliquation* is not made, either by an *Ouer-Dry Heat*, or an *Ouer-Moist Heat*. For *Ouer-Moisture* doth somewhat extinguish the *Heat*; As we see that euen *Hot water* quenched Fire: And *Ouer-Dry Heat* shutteth the *Pores*: And therefore Men will sooner *Sweat* couered before the *Sunne* or *Fire*, than if they stood *Naked*; And *Earthen Bottles*, filled with *Hot water*, doe prouoke, in Bed, a *Sweat* more daintily, than *Brick-bats Hot*. Secondly, *Hot water* doth cause *Enaporation* from the *Skin*; So as it spendeth the Matter, in those *Parts vnder the water*, before it issueth in *Sweat*. Again, *Sweat* commeth more plentifully, if the *Heat* be increased by *Degrees*, than if it be greatest at first, or equall. The Cause is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening, the *Sweat* issueth more abundantly. And therefore *Physitians* may doe well, when they prouoke *Sweat* in Bed, by *Bottles*, with a *Decoction* of *Sudorifike Herbs* in *Hot water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the lesse *Heated* first, and after halfe an houre the more *Heated*.

Sweat is *Salt* in Taste; The Cause is, for that, that *Part* of the *Nourishment*, which is *Fresh* and *Sweet*, turneth into *Bloud*, and *Flesh*; And the *Sweat* is only that *Part* which is *Separate* and *Excerned*. *Bloud* also *Raw*, hath some *Saltneesse*, more than *Flesh*; because the *Assimilation* into *Flesh*, is not without a little and subtile *Excretion* from the *Bloud*.

Sweat commeth forth more out of the *Vpper Parts* of the *Body*, than the *Lower*; The Reason is, because those *Parts* are more replenished with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are lesse *Fleshie*, and *Sweat* issueth (chiefly) out of the *Parts* that are lesse *Fleshie*, and more *Drie*; As the *Fore-head*, and *Breast*.

Men *Sweat* more in *Sleepe* than *Waking*; And yet *Sleepe* doth rather stay other *Fluxions*, than cause them; As *Rheumes*, *Loosenesse* of the *Body*, &c. The Cause is, for that in *Sleepe*, the *Heat* and *Spirits* doe naturally moue inwards, and there rest. But when they are collected once within, the *Heat* becommeth more *Violent*, and *Irritate*; And thereby expelleth *Sweat*.

Cold Sweats are (many times) *Mortall*, and neere *Death*; And alwayes *Ill*, and *Suspected*; As in *Great Feares*, *Hypochondriacall Passions*, &c. The Cause is, for that *Cold Sweats* come by a *Relaxation* or *Forsaking* of the

Experiments
in Consort,
touching Sweat
706

707

708

709

710

Spirits, whereby the *Moisture* of the *Body*, which *Heat* did keepe firme in the *Parts*, severeth, and issueth out.

In those *Diseases* which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to be stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it causeth and lighteneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the latter Sort is partly *Criticall*, and sendeth forth the *Matter* that offendeth; But in the Former, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them Oppressed; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moveth to an *Expulsion* indifferent over all the *Body*.

Experiment
Solitary touch-
ing the *Glo-*
worme.

712

THE *Nature* of the *Glo-worme* is hitherto not well observed. Thus much we see; That they breed chiefly in the *Hottest Moneths* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes* and *Hedges*. Whereby it may be conceived, that the *Spirit* of them is very fine, and not to be refined but by *Summer Heats*: And againe, that by reason of the *Fineness*, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Flie* they call *Lucciole*, that shineth as the *Glo-worme* doth; And it may be is the *Flying Glo-worme*. But that *Fly* is chiefly vpon *Fens*, and *Marrishes*. But yet the two former *Observations* hold; For they are not seene but in the *Heat* of *Summer*; And *Sedge*, and other *Greene* of the *Fens*, giue as good *Shade*, as *Bushes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so farre as to be winged.

Experiments
in Confort,
touching the
Impressions,
which the *Passions* of the
Minde make
vpon the *Body*.

713

THE *Passions* of the *Minde*, worke vpon the *Body* the *Impressions* following. *Feare* causeth *Paleness*; *Trembling*; The *Standing* of the *Haire* vpright; *Starting*; and *Skritch*ing. The *Paleness* is caused, for that the *Bloud* runneth inward, to succour the *Heart*. The *Trembling* is caused, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are destituted, and not sustained. *Standing vpright* of the *Haire* is caused, for that by the *Shutting* of the *Pores* of the *skin*, the *Haire* that lieth asloape, must needs Rise. *Starting* is both an *Apprehension* of the *Thing feared*; (And, in that *Kinde*, it is a *Motion* of *Shrinking*;) And likewise an *Inquisition*, in the beginning, what the *Matter* should be; (And in that *kinde* it is a *Motion* of *Erection*;) And therefore when a *Man* would listen suddenly to any *Thing*, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Skritch*ing is an *Appetite* of *Expelling* that which suddenly striketh the *Spirits*: For it must be noted, that many *Motions* though they be vnprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cause *Motions* by *Consent*, As in *Groaning*, or *Crying* vpon *Paine*.

714

Griefe and *Paine* cause *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Teares*; *Distorting* of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is caused by the drawing in of a greater *Quantity* of *Breath* to refresh the *Heart* that laboureth: like a great *Draught* when one is thirsty.

Sobbing

Sobbing is the same Thing stronger. *Groaning*, and *Screaming*, and *Roaring*, are caused by an *Appetite* of *Expulsion*, as hath beene said: For when the *Spirits* cannot expell the Thing that hurteth, in their strife to do it, by *Motion* of *Consent*, they expell the *Voice*. And this is, when the *Spirits* yeeld, and giue ouer to resist; For if one doe constantly resist *Faine*, he will not groane. *Tearcs* are caused by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by consequence astringeth the *Moisture* of the *Braine*; and thereby sendeth *Tearcs* into the *Eyes*. And this *Contraction*, or *Compression* causeth also *Wringing* of the *Hands*; For *Wringing* is a *Gesture* of *Expression*, of *Moisture*. The *Distorting* of the *Face* is caused by a *Contention*, first to bear and resist, and then to expell. Which maketh the *Parts* knit first, and afterwards open. *Grinding* of the *Teeth* is caused (likewise) by a *Gathering* and *Serring* of the *Spirits* together to resist; Which maketh the *Teeth* also to set hard one against another. *Sweating* is also a *Compound Motion* by the *Labour* of the *Spirits*, first to resist, and then to expell.

Ioy causeth a *Chearefulnessse*, and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And sometimes *Tearcs*. All these are the *Effects* of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Linely*, and *Stirring*. We know it hath beene seene, that *Excessiue sudden Ioy*, hath caused *Present Death*, while the *Spirits* did spread so much, as they could not retire againe. As for *Tearcs*, they are the *Effects* of *Compression* of the *Moisture* of the *Braine*, vpon *Dilatation* of the *Spirits*. For *Compression* of the *Spirits* worketh an *Expression* of the *Moisture* of the *Braine*, by *Consent*, as hath beene said in *Griefe*. But then in *Ioy*, it worketh it diuersly; viz. by *Propulsion* of the *Moisture*, when the *Spirits* dilate, and occupy more *Roome*.

Anger causeth *Palenessse* in some, and the *Going* and *Comming* of the *Colour* in Others: Also *Trembling* in some; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fist*. *Palenessse*, and *Going*, and *Comming* of the *Colour*, are caused by the *Burning* of the *Spirits* about the *Heart*; Which to refresh themselues call in more *Spirits* from the *Outward Parts*. And if the *Palenessse* be alone, without *Sending forth* the *Colour* againe, it is commonly ioyned with some *Feare*; But in many there is no *Palenessse* at all, but contrariwise *Rednessse* about the *Gheekes*, and *Gils*; Which is by the *Sending forth* of the *Spirits* in an *Appetite* to *Reuenge*. *Trembling* in *Anger* is likewise by a *Calling in* of the *Spirits*; And is commonly, when *Anger* is ioyned with *Feare*. *Swelling* is caused, both by a *Dilatation* of the *Spirits* by *Ouer-Heating*, and by a *Liquefaction* or *Boyling* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the same *Cause*, being an *Ebullition*. *Stamping*, and *Bending* of the *Fist*, are caused by an *Imagination* of the *Act* of *Reuenge*.

Light Displeasure or *Dislike*, causeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Brows*. These *Effects* arise from the same *Causes* that *Trembling*, and *Horror* doe; Namely, from the *Retiring* of the *Spirits*, but in a lesse degree. For the *Shaking* of the *Head* is but a *Slow* and

718

Definite Trembling; And is a Gesture of Slight Refusal: And we see also, that a Dislike causeth (often) that Gesture of the Hand, which we use when we refuse a Thing, or warne it away. The Frowning and Knitting of the Browes, is a Gathering or Serring of the Spirits, to resist in some Measure. And we see also, this Knitting of the Browes, will follow vpon earnest Studying, or Cogitation of any Thing, though it be without Dislike.

719

Shame causeth Blushing; And Casting downe of the Eyes. Blushing is the Resort of Bloud to the Face; Which in the Passion of Shame is the Part that laboureth most. And although the Blushing will be seen in the whole Breast, if it be Naked, yet that is but in Passage to the Face. As for the Casting downe of the Eyes, it proceedeth of the Reuerence a Man beareth to other Men; Whereby, when he is ashamed, he cannot endure to looke firmly vpon Others: And we see that Blushing, and the Casting downe of the Eyes both, are more when we come before Ma-ny; Ore Pompeij, quid mollis? Nunquam non coram pluribus erubuit: And likewise when we come before Great, or Reuerend Persons.

720

Pity causeth sometimes Teares; And a Flexion or Cast of the Eye aside. Teares come from the same Cause that they doe in Griefe; for Pity is but Griefe in anothers Behalfe. The Cast of the Eye is a Gesture of Auerfion, or Lothnesse to behold the Obiect of Pity.

721

Wonder causeth Astonishment, or an Immoveable Posture of the Body; Casting vp of the Eyes to Heauen, And Lifting vp of the Hands. For Astonishment, it is caused by the Fixing of the Minde vpon one Obiect of Cogitation, whereby it doth not spariate and transcurre, as it vseth: For in wonder the Spirits flie not, as in Feare; But onely settle, and are made lesse apt to moue. As for the Casting vp of the Eyes, and Lifting vp of the Hands, it is a Kinde of Appeale to the Deity; Which is the Author, by Power, and Providence, of Strange Wonders.

Laughing causeth a Dilatation of the Mouth, and Lips; A Continued Expulsion of the Breath, with the loud Noise, which maketh the Interiection of Laughing; Shaking of the Breast, and Sides; Running of the Eies with water, if it be Violent, and Continued. Wherein first it is to be vnderstood, that Laughing is scarce (properly) a Passion, but hath his Source from the Intellect; For in Laughing there euer precedeth a Conceit of somewhat Ridiculous. And therefore it is Proper to Man. Secondly, that the Cause of Laughing is but a Light Touch of the Spirits, and not so deepe an Impression as in other Passions. And therefore (that which hath no Affinity with the Passions of the Minde) it is moued, and that in great vehemency, only by Tickling some Parts of the Body: And we see that Men euen in a Griued State of Minde, yet cannot sometimes forbear Laughing. Thirdly, it is euer ioyned with some Degree of Delight: And therefore Exhilaration hath some Affinity with Ioy, though it be a much Lighter Motion: Res seuerast verum Gaudium. Fourthly, that the Obiect of it is Deformity, Absurdity, Shrewd Turnes, and the like. Now to speake of the Causes of the Effects before mentioned, whereunto these

Generall

Generall Notes giue some Light. For the *Dilatation* of the *Mouth* and *Lips*, *Continued Expulsion* of the *Breath* and *Voice*, and *Shaking* of the *Breast* and *Sides*, they proceed(all) from the *Dilatation* of the *Spirits*; Especially being *Sudden*. So likewise, the *Running* of the *Eyes* with *Water*, (as hath beene formerly touched, where we spake of the *Tear*es of *Ioy* and *Griefe*;) is an Effect of *Dilatation* of the *Spirits*. And for *Suddenesse*, it is a great Part of the *Matter*: For we see, that any *Shrew'd Turne* that lighteth vpon Another; Or any *Deformitie*, &c. moueth *Laughter* in the Instant; Whish after a little time it doth not. So we cannot *Laugh* at any Thing after it is *Stale*, but whilest it is *New*: And euen in *Tickling*, if you *Tickle* the *Sides*, and giue warning; Or giue a *Hard* or *Continued Touch*, it doth not moue *Laughter* so much.

Lust causeth a *Flagrancie* in the *Eyes*; and *Priapisme*. The Cause of both these is, for that in *Lust*, the *Sight*, and the *Touch*, are the Things desired: And therefore the *Spirits* resort to those parts, which are most affected. And note well in generall, (For that great Vse may be made of the *Observation*;) that (euermore) the *Spirits*, in all *Passions*, resort most to the *Parts*, that labour most, or are most affected. As in the last, which hath beene mentioned, they resort to the *Eyes*, and *Venerable Parts*: In *Fear*e, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light dislikes* to the *Head*.

IT hath beene obserued by the *Ancients*, and is yet beleeued, that the *Sperme* of *Drunken Men* is *Vnfruitfull*. The Cause is, for that it is *Overmoistened*, and wanteth *Spissitude*. And wee have a merry Saying, that they that goe *Drunke* to *Bed*, get *Daughters*.

Drunken Men are taken with a plaine *Defect*, or *Destitution* in *Voluntary Motion*. They *Reele*; They *tremble*; They cannot stand, nor speake strongly. The Cause is, for that the *Spirits* of the *Wine*, oppresse the *Spirits Animall*, and occupate Part of the Place, where they are; And so make them *Weake* to moue. And therefore *Drunken Men* are apt to fall asleepe: And *Opiates*, and *Stupefactiues*, (as *Poppie*, *Henbane*, *Hemlocke*, &c.) induce a kinde of *Drunkenesse*, by the *Grossenesse* of their *Vapour*; As *Wine* doth by the *Quantitie* of the *Vapour*. Besides, they rob the *Spirits Animall* of their *Matter*, whereby they are nourished: For the *Spirits* of the *Wine* prey vpon it, as well as they: And so they make the *Spirits* lesse *Supple*, and *Apt* to moue.

Drunken Men imagine euery Thing turneth round; They imagine also that Things Come vpon them; They See not well Things a farre off; Those Things that they See neare hand, they See out of their Place; And (sometimes) they see Things double. The Cause of the Imagination that Things turne round, is, for that the *Spirits* themselves turne, being compressed by the *Vapour* of the *Wine*: (For any *Liquid Body* vpon *Compression*, turneth, as we see in *Water*;) And it is all one to the *Sight*, whether the *Visuall Spirits* moue, or the *Object* moueth, or the *Medium* moueth. And wee see that long *Turning Round* breedeth the same Imagination.

The

722

Experiments
in Confort
touching *Drun-*
kennesse.

723

724

725

The Cause of the Imagination that *Things come upon them*, is, for that the *Spirits Visuall* themselves draw backe; which maketh the *Obiect* seeme to come on; And besides, when they see Things turne Round, and Moue, *Feare* maketh them thinke they come vpon them. The Cause that they cannot see *Things a farre off*, is the *weaknesse* of the *Spirits*; for in euery *Megrim*, or *Vertigo*, there is an *Obtenebration* ioyned with a Semblance of *Turning round*; Which we see also in the lighter Sort of *Swonings*. The Cause of *Seeing things out of their Place*, is the *Refraction* of the *Spirits Visuall*; For the *Vapour* is as an *Vnequall Medium*; And it is, as the Sight of Things, out of place, in *water*. The Cause of *Seeing Things double*, is, the *Swift* and *Vnquiet Motion* of the *Spirits*, (being Oppressed,) to and fro; For, (as was said before,) the *Motion* of the *Spirits Visuall*, and the *Motion* of the *Obiect*, make the same *Appearances*; And for the *Swift Motion* of the *Obiect*, we see, that if you fill a *Lute-string*, it sheweth double, or Treble.

726

Men are sooner *Drunke* with *Small Draughts*, than with *Great*. And againe, *wine Sugred* inebriateth lesse, than *Wine Pure*. The Cause of the Former is, for that the *wine* descendeth not so fast to the *Bottom* of the *Stomach*; But maketh longer Stay in the *Vpper Part* of the *Stomach*, and sendeth *Vapours* faster to the *Head*; And therefore inebriateth sooner. And, for the same Reason, *Sops in wine*, (*Quantitie for Quantitie*,) inebriate more, than *Wine* of it selfe. The Cause of the Latter is, for that the *Sugar* doth inspissate the *Spirits* of the *wine*, and maketh them not so easie to resoluue into *Vapour*. Nay further, it is thought to bee some Remedie against *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the same Effect is wrought either by *Oyle*, or *Milke*, taken vpon much *Drinking*.

Experiment
Solitary touch-
ing the Helpe
or Hurt of
Wine, though
Moderately used.

727

The Use of *Wine*, in *Drie*, and *Consumed Bodies*, is hurtfull; In *Moist*, and *Full Bodies*, it is good. The Cause is, for that the *Spirits* of the *Wine* doe prey vpon the *Dew*, or *Radical Moisture*, (as they terme it) of the *Bodie*, and to deceiue the *Animall Spirits*. But where there is *Moisture* Enough, or Superfluous, there *Wine* helpeth to digest, and delicate the *Moisture*.

Experiment
Solitary touch-
ing Caterpillers.

728

The *Caterpillar* is one of the most Generall of *wormes*, and breedeth of *Dew*, and *Leaves*: For we see infinite Number of *Caterpillers*, which breed vpon *Trees*, and *Hedges*; By which the *Leaves* of the *Trees*, or *Hedges*, are in great Part consumed; As well by their Breeding out of the *Leafe*, as by their Feeding vpon the *Leafe*. They breed in the *Spring* chiefly, because then there is both *Dew*, and *Leafe*. And they breed commonly when the *East-winds* haue much blowne: The Cause whereof is, the *Driness* of that *Wind*: For to all *Viuification* vpon *Putrification*, it is requisite the *Matter* be not too *Moist*: And therefore we see, they haue *Copwebs* about them, which is a signe of a *Slimy Driness*: As we see vpon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwebs* breed all ouer.

We

Wee see also the *Greene Caterpillar* breedeth in the Inward Parts of *Roses*, especially not blowne, where the *Dew* sticketh: But especially *Caterpillars*, both the greatest and the most, breed vpon *Cabbages*, which haue a *Fat Lease*, and apt to *Putrifie*. The *Caterpillar* towards the *End of Summer*, waxeth *Volatile*, and turneth to a *Butterfly*, or perhaps some other *Fly*. There is a *Caterpillar*, that hath a *Furre*, or *Downe* vpon him, and seemeth to haue Affinitie with the *Silke-worme*.

THe *Flyes Cantharides* are bred of a *worme*, or *Caterpillar*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-tree*, the *Pine-tree*, and the *Walde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpenesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosiue*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Abstersiue*: The *Fruit* of the *Briar* is said to make *Children*, or those that Eat them, *Scabbed*. And therefore, no manuell though *Cantharides* haue such a *Corrosiue*, and *Cauterizing Qualitie*; For there is not any other of the *Insecta*, but is bred of a *Duller Matter*. The *Body* of the *Cantharides* is bright coloured; And it may bee, that the delicate-coloured *Dragon-Flyes*, may haue likewise some *Corrosiue Quality*.

Experiment
Solitary touch-
ing the *Flyes*
Cantharides.

729

Lassitude is remedied by *Bathing*, or *Anointing* with *Oyle*, and *Warmed Water*. The *Cause* is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Anointing* giue a *Relaxation*, or *Emollition*: And the *Mixture* of *Oyle*, and *water*, is better than either of them alone; Because *water* Entreth better into the *Pores*, and *Oyle* after Entry softneth better. It is found also that the *Taking* of *Tobacco* doth helpe and discharge *Lassitude*. The *Reason* whereof is, partly, because by *Chearing* or *Comforting* of the *Spirits*, it openeth the *Parts* *Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so discharge *wearinesse*; as *Sleepe* likewise doth.

Experiments
in Confort,
touching *Lassi-*
tude.

730

In *Going up a Hill*, the *Knees* will be most *weary*; In *Going downe a Hill*, the *Thighes*. The *Cause* is, for that, in the *Lift* of the *Feet*, when a Man *Goeth up the Hill*, the *Weight* of the *Body* beareth most vpon the *Knees*; And in *Going downe the Hill*, vpon the *Thighes*.

731

The *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; But not rightly: For that were to make euery *Casting* of the *Skin* a *New Birth*: And besides, the *Secundine* is but a generall *Couer*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*, the *Viper*, the *Grasshopper*, the *Lizard*, the *Silke-worme*; &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crawfish*, the *Hodman-dod* or *Dodman*, the *Tortoise*; &c. The *Old Skins* are found; but the *Old Shells* neuer: So as it is like, they scale off, and crumble away by degrees. And they are knowne by the Extreme *Tendernesse* and *Softnesse* of

Experiment
Solitary touch-
ing the *Ca-*
sting of the
Skin, and *Shell*,
in some *Crea-*
tures.

732

of the *New Shell*; And sometimes by the *Freshnesse* of the *Colour* of it. The *Cause* of the *Casting* of *Skin*, and *Shell*, should seeme to be the great *Quantitie* of *Matter* in those *Creatures*, that is fit to make *Skin*, or *Shell*, And Againe, the *Loosenesse* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*, And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds*, that haue much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments
in Confort,
touching the
Postures of the
Bodie.

733

Lying, not *Erect*, but *Hollow*, which is in the Making of the Bed; Or with the *Legs gathered up*, which is in the Posture of the Body, is the more Wholefome. The *Reason* is, the better *Comforting* of the *Stomach*, which is by that lesse *Penfile*: And we see, that in *Weake Stomachs*, the Laying vp of the *Legs* high, and the *Knees* almost to the *Mouth*, helpeth, and comforteth. We see also that *Gally-Slaves*, notwithstanding their *Misery* otherwise, are commonly *Fat* and *Fleshy*; And the *Reason* is, because the *Stomach* is supported somewhat in *Sitting*; And is *Penfile* in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to choose those *Exercises*, where the *Limbs* move more than the *Stomach*, and *Belly*; As in *Rowing*, and in *Sawing* being *Set*.

734

Megrims and *Giddinesse* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The *Cause* is, for that the *Vapours*, which were gathered by *Sitting*, by the *Sudden Motion*, fly more vp into the *Head*.

735

Leaning long vpon any *Part* maketh it *Numme*, and, as wee call it, *Asleepe*. The *Cause* is, for that the *Compreesion* of the *Part* suffereth not the *Spirits* to haue free *Accesse*; And therefore, when wee come out of it, wee feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

Experiment
Solitary tou-
ching *Pestilen-
tiall Teares*.

736

IT hath beene noted, that those *Teares* are *Pestilentiall*, and *Vnwhole-
some*, when there are great *Numbers* of *Frogs*, *Flies*, *Locusts*, &c. The *Cause* is plaine; For that those *Creatures* being engendred of *Putrifaction*, when they abound, shew a generall *Disposition* of the *Teare*, and *Constitution* of the *Aire*, to *Diseases* of *Putrifaction*. And the same *Prognosticke*, (as hath beene said before,) holdeth, if you finde *Wormes* in *Oake-Apples*. For the *Constitution* of the *Aire*, appeareth more subtilly, in any of these *Things*, than to the *Sense* of *Man*.

Experiment
Solitary tou-
ching the *Pro-
gnosticks* of *Hard
Winters*.

737

IT is an Obseruation amongst *Country-People*, that *Teares* of *Store* of *Haws* and *Heps*, doe commonly portend *Cold Winters*; And they ascribe it to *Gods Providence*, that, (as the *Scripture* saith) reacheth euen to the *Falling of a Sparrow*; And much more is like to reach to the *Preseruati-
on* of *Birds* in such *Seasons*. The *Naturall Cause* also may be the *Wans* of *Heat*, and *Abundance* of *Moisture*, in the *Summer* precedent; Which putteth forth those *Fruits*, and must needs leaue great *Quantitie* of *Cold Va-
pours*,

pours, not dissipate; Which causeth the Cold of the Winter following.

They haue in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the same Name, as *Blacke* as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into Powder, in *Water*, as Hot as they can drinke it: And they take it, and sit at it, in their *Coffa-Houses*, which are like our *Tavernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Disgestion*. Certainly this *Berry Coffa*; The *Root*, and *Leafe Betel*; The *Leafe Tobacco*; And the *Teare of Poppy*, (*Opium*) of which the *Turkes* are great Takers, (supposing it expelleth all Feare;) doe all Condense the *Spirits*, and make them Strong, and Aleger. But it seemeth they are taken after severall manners, For *Coffa* and *Opium* are taken downe; *Tobacco* but in *Smoake*; And *Betel* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quere* of *Henbane-Seed*; Of *Mandrake*; Of *Saffron*, *Root*, and *Flower*; Of *Folium Indum*; Of *Amber-grice*; Of the *Assyrian Amomum*, if it may be had, And of the *Scarlet Powder*, which they call *Kermex*; And (generally) of all such Things, as doe inebriate, and prouoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible euer than *Leaves*.

Experiment
Solitary touch-
ing Medi-
cines that Con-
dense, and Re-
leue the Spirits.

738

The *Turkes* haue a *Blacke Powder*, made of a *Minerall* called *Alcobole*; Which with a fine long *Pencill* they lay vnder their *Eye-lids*; Which doth colour them *Blacke*; Whereby the *white* of the *Eye* is set off more *White*. With the same *Powder* they colour also the *Haires* of their *Eye-lids*, and of their *Eye-browes*, which they draw into Embowed *Arches*. You shall finde that *Xenophon* maketh Mention, that the *Medes* vsed to paint their *Eyes*. The *Turkes* vse with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* *Blacke*: And diuers with vs, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* *Blacke*, by Combing it, (as they say,) with a *Leaden Combe*, or the like. As for the *Chineses*, who are of an ill Complexion, (being *Oliuaster*;) they paint their *Cheekes* *Scarlet*; Especially their *King*, and *Grandes*. Generally, *Barbarous People*, that goe *Naked*, doe not only paint Themselves, but they pounce and raze their *Skinne*, that the *Painting* may not be taken forth. And make into *Workes*. So doe the *West Indians*; And so did the *Ancient Piccs*, and *Brittons*; So that it seemeth, *Men* would haue the *Colours* of *Birds Feathers*, if they could tell how; Or at least, they will haue *Gay Skins*, in stead of *Gay Cloathes*.

Experiment
Solitary touch-
ing Paintings
of the Body.

739

It is strange, that the *Vse* of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and *Grecians*, it was as vsuall, as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with vs it remaineth but as a Part of *Physicke*. I am of Opinion, that the *Vse* of it, as it was with the *Romans*, was hurtfull to Health; For that it made the Body Soft, and easie to Waste. For the *Turkes* it is more proper, because that their *Drin-*

Experiment
Solitary touch-
ing the Vse
of Bathing and
Anointing.

740

king

king water, and *Feeding* vpon *Rixe*, and other Food of small nourishment, maketh their *Bodies* so Solide, and Hard, as you need not feare that *Bathing* should make them *Fronhie*. Besides, the *Turkes* are great *Sitters*, and seldome walke; VWhereby they Sweat lesse, and need *Bathing* more. But yet certaine it is, that *Bathing*, and especially *Annoyning*, may be so vfed, as it may be a great Helpe to *Health*, and *Prolongation* of *Life*. But hereof we shall speake in due Place, when we come to handle *Experiments Medicinall*.

Experiment
Solitary tou-
ching *Chamo-*
letting of Paper.

741

THe *Turkes* haue a Pretty Art of *Chamoletting of Paper*, which is not with vs. in vse. They take diuers *oyled Colours*, and put them seuerally (in drops) vpon *water*; And stirre the *Water* lightly; And then wet their *Paper*, (being of some *Thicknesse*,) with it; And the *Paper* will be *Waxed*, and *Veined*, like *Chamoles*, or *Marble*.

Experiment
Solitary tou-
ching *Cuttle-*
Inke.

742

IT is somewhat strange, that the *Blond* of all *Birds*, and *Beasts*, and *Fishes*, should be of a *Red Colour*, and only the *Blond* of the *Cuttle* should be as *Blacke* as *Inke*. A Man would thinke, that the *Cause* should be the *High Concoction* of that *Blond*; For we see in ordinary *Puddings*, that the *Boyling* turneth the *Blond* to be *Blacke*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Request.

Experiment
Solitary tou-
ching *Encrease*
of weight in
Earth.

743

IT is reported of Credit, that if you take *Earth* from Land adioyning to the *Riuer* of *Nile*; And preferue it in that manner, that it neither come to be *Wet*, nor *Wasted*; And *Weigh* it daily, it will not alter *weight* vntill the seuenteenth of *Iune*, which is the Day when the *Riuer* beginneth to rise; And then it will grow more and more *Ponderous*, till the *Riuer* commeth to his Heighth. Which if it bee true, it cannot bee caused, but by the *Aire*, which then beginneth to *Condense*; And so turneth within that small *Mould* into a degree of *Moisture*; Which produceth *Weight*. So it hath been obserued, that *Tobacco*, Cut, and *Weighed*, and then *Dried* by the *Fire*, loseth *Weight*; And after being laid in the open *Aire*, recouereth *Weight* againe. And it should seeme, that as soone as euer the *Riuer* beginneth to increase, the whole *Body* of the *Aire* thereabouts suffereth a Change: For (that which is more strange,) it is credibly affirmed, that vpon that very Day, when the *Riuer* first riseth, great *Plagues* in *Cairo*, vse suddenly to breake vp.

Experiments
in Consort
touching
Sleepe.

744

THose that are very *Cold*, and especially in their *Feet*, cannot get to *Sleepe*. The *Cause* may be, for that in *Sleepe* is required a *Free Respiration*, which *Cold* doth shut in, and hinder: For wee see, that in great *Colds*, one can scarce draw his *Breath*. Another *Cause* may be, for that *Cold* calleth the *Spirits* to succour; And therefore they cannot so well close, and goe together in the *Head*; Which is euer requisite to *Sleepe*. And for the same *Cause*, *Pain*, and *Noise* hinder *Sleepe*; And *Darknesse* (contrariwise) furthereth *Sleepe*.

Some

Some Noises (whereof we spake in the 112. Experiment) helpe sleepe; As the Blowing of the wind, the Trickling of water, Humming of Bees, Soft Singing Reading, &c. The Cause is, for that they moue in the Spirits a gentle Attention; And whatsoeuer moueth Attention, without too much Labour, stilleth the Naturall and discursiue Motion of the Spirits.

Sleepe nourisheth, or at least preserveth Bodies, a long time, without other Nourishment. Beasts that sleepe in winter, (as it is noted of wilde Beares,) during their Sleep, wax very Fat, though they Eat nothing. Bats haue beene found in Ouens, and other Hollow Close Places, Matted one vpon another; And therefore it is likely that they sleepe in the Winter time, and eat Nothing. Quere, whether Bees doe not Sleep all Winter, and spare their Honey? Butterflies, and other Flies, doe not onely sleepe, but lie as Dead all winter; And yet with a little Heat of Sunne, or Fire, reuiue againe. A Dormouse, both winter and Summer, will sleepe some dayes together, and eat Nothing.

To restore Teeth in Age, were Magnale Nature. It may bee thought of. But howsoeuer the Nature of the Teeth deserueth to be enquired of, as well as the other Parts of Liuing Creatures Bodies.

There be Five Parts in the Bodies of Liuing Creatures, that are of Hard Substance; The Skull, The Teeth, The Bones, The Hornes, and the Nails. The greatest Quantity of Hard Substance Continued, is towards the Head. For there is the Skull of one Entire Bone; There are the Teeth; There are the Maxillarie Bones; There is the Hard Bone, that is the Instrument of Hearing; And thence issue the Hornes: So that the Building of Liuing Creatures Bodies, is like the Building of a Timber-House, where the walls and other Parts haue Columnes and Beames; But the Roofe is, in the better Sort of Houses, all Tile, or Lead, or Stone. As for Birds, they haue Three other Hard Substances proper to them; The Bill, which is of like Matter with the Teeth; For no Birds haue Teeth: The Shell of the Egge: And their Quills: For as for their Spurre, it is but a Nail. But no Liuing Creatures, that haue shels very hard; (As Oysters, Cockles, Muffles, Scallops, Crabs, Lobsters, Cra-Fish, Shrimps, and especially the Tortoise,) haue Bones within them, but onely little Gristles.

Bones, after full Growth, continue at a Stay: And so doth the Skull: Hornes, in some Creatures, are cast and renewed: Teeth stand at a Stay, except their Wearing: As for Nails, they grow continually: And Bills and Beakes will ouer-grow, and sometimes be cast; as in Eagles, and Parrots.

Most of the Hard Substances lie to the Extremes of the Body; As skull, Hornes, Teeth, Nails, and Beakes: Only the Bones are more Inward, and clad with Flesh. As for the Entrailles, they are all without Bones; Saue that a Bone is (sometimes) found in the Heart of a Stag; And it may be in some other Creature.

745

746

Experiments
in Consort
touching Teeth
and Hard Sub-
stances in the
Bodies of Liuing
Creatures.

747

749

750

The *Skull* hath *Braines*, as a kinde of *Marrow*, within it. The *Backe-Bone* hath one Kinde of *Marrow*, which hath an Affinitie with the *Braine*; And other *Bones* of the *Body* haue another. The *Iaw-Bones* haue no *Marrow* Seuered, but a little *Pulpe* of *Marrow* diffused. *Teeth* likewise are thought to haue a kinde of *Marrow* diffused, which causeth the *Sense* and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Sense*; No more than *Bloud*. *Horne* is alike thorowout; And so is the *Naile*.

751

None other of the *Hard Substances* haue *Sense*, but the *Teeth*: And the *Teeth* haue *Sense*, not onely of *Paine*, but of *Cold*.

But we will leaue the Enquiries of other *Hard Substances*, vnto their seuerall Places; And now enquire onely of the *Teeth*.

752

The *Teeth* are, in *Men*, of three Kinds: *Sharpe*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; And *Pointed Teeth*, or *Canine*, which are betweene both. But there haue been some *Men*, that haue had their *Teeth* vndiuided, as of one whole *Bone*, with some little Marke in the Place of the Diuision; as *Pyrrhus* had. Some *Creatures* haue *Ouer-long*, or *Out-growing Teeth*, which we call *Fangs*, or *Tuskes*; As *Boares*, *Pikes*, *Salmons*, and *Dogs*, though lesse. Some *Liuing Creatures* haue *Teeth* against *Teeth*; As *Men*, and *Horses*; And some haue *Teeth*, especially their *Master-Teeth*, indented one within Another, like *Sawes*; As *Lions*; And so againe haue *Dogs*. Some *Fishes* haue diuers *Rowes* of *Teeth*, in the *Roofes* of their *Mouthes*; As *Pikes*, *Salmons*, *Trouts*, &c. And many more in *Salt-waters*. *Snakes* and other *Serpents*, haue *Venemous Teeth*; which are sometimes mistaken for their *Sting*.

753

No *Beast* that hath *Hornes*, hath *Vpper Teeth*; And no *Beast*, that hath *Teeth* aboue, wanteth them below: But yet if they be of the same kinde, it followeth not, that if the *Hard Matter* goeth not into *Vpper Teeth*, it will goe into *Hornes*; Nor yet e conuerso; For *Doë's*, that haue no *Hornes*, haue no *Vpper Teeth*.

754

Horses haue, at three yeares old, a *Tooth* put forth, which they call the *Cohs Tooth*; And at foure yeeres old there commeth the *Mark-Tooth*, which hath a *Hole*, as big as you may lay a *Pease* within it; And that weareth shorter and shorter, euery yeare; Till that at eight yeares old, the *Tooth* is smooth, and the *Hole* gone; And then they say; That the *Marke* is out of the *Horses Mouth*.

755

The *Teeth* of *Men* breed first, when the *Childe* is about a yeere and halfe old: And then they cast them, and new come about seuen yeares old. But diuers haue *Back-ward Teeth* come forth at Twentie, yea some at Thirty, and Forty. Quere of the manner of the *Comming* of them forth. They tell a Tale of the old *Countesse* of *Desmond*, who liued till she was seuen-score yeeres old, that she did *Dentire*, twice, or thrice; Casting her old *Teeth*, and others comming in their Place.

756

Teeth are much hurt by *Sweet-Meats*; And by *Painting* with *Mercury*; And by *Things Ouer-hot*; And by *Things Ouer-cold*; And by *Rheumes*. And the *Paine* of the *Teeth*, is one of the sharpest of *Paines*.

Concerning

Concerning *Teeth*, these Things are to bee Considered. 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with *Least Paine*. 4. The *Staying* and *Easing* of the *Tooth-Ach*. 5. The *Binding* in of *Artificiall Teeth*; where *Teeth* haue beene stricken out. 6. And last of all, that Great One, of *Restoring Teeth* in *Age*. The *Instances* that giue any likelihood of *Restoring Teeth* in *Age*, are; The *Late Comming* of *Teeth* in some; And the *Renewing* of the *Beakes* in *Birds*, which are *Commateriall* with *Teeth*. *Quare* therefore more particularly how that commeth. And againe, the *Renewing* of *Hornes*. But yet that hath not beene knowne to haue beene prouoked by *Art*; Therefore let *Triall* bee made, whether *Hornes* may bee procured to grow in *Beasts* that are not *Horned*, and how? And whether they may bee procured to come *Larger* than vsuall; As to make an *Oxe*, or a *Deere*, haue a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spitted*, may be brought againe to be more *Branched*; For these *Trialls*, and the like, will shew, whether by *Art* such *Hard Matter* can be called, and prouoked. It may be tried also, whether *Birds* may not haue some thing done to them, when they are *Young*, whereby they may be made to haue *Greater*, or *Longer Bills*; Or *Greater* and *Longer Talons*? And whether *Children* may not haue some *wash*, or Something to make their *Teeth* *Better*, and *Stronger*? *Corall* is in vse as an *Helpe* to the *Teeth* of *Children*.

Some *Living Creatures* generate but at certaine *Seasons* of the *Yeare*; As *Deere*, *Sheepe*, *wilde Conneyes*, &c. And most Sorts of *Birds*, and *Fishes*: Others at any time of the *Yeare*, as *Men*; And all *Domesticke Creatures*; As *Horses*, *Hogges*, *Dogges*, *Cats*, &c. The *Cause* of *Generation* at all *Seasons* seemeth to bee *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse* ariseth from two *Causes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moist*, and *Sanguine*; Or from *Plenty* of *Food*. For the first, *Men*, *Horses*, *Dogs*, &c. which breed at all *Seasons*, are full of *Heat* and *Moisture*; *Doves* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Dove* almost continually. But *Deere* are a *Melancholy Dry Creature*, as appeareth by their *Fearfulness*, and the *Hardnesse* of their *Flesh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildnesse*, and for that they seldome *Drinke*. Most sort of *Birds* are of a dry *Substance* in comparison of *Beasts*. *Fishes* are cold. For the second *Cause*; *Fulnesse* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *wilde*, generate seldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulnesse* of *Food*. We finde, that the Time of *Going to Rut* of *Deere*, is in *September*; For that they need the whole *Summers Feed* and *Grasse*, to make them fit for *Generation*. And if *Raine* come Early about the Middle of *September*, they goe to *Rut* somewhat the sooner; If *Drought*, somewhat the later. So *Sheepe*, in respect of their small *Heat*, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at cer-

Experiments
in Consorty,
touching the
Generation and
Bearing of Li-
uing Creatures
in the Wombe.

tain *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *winter*, and the *Heat*, and *Comfort* of the *Spring* prepareth them. There is also another *Reason*, why some *Creatures* generate at certain *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of *Generation*: For no *Creature* goeth to generate, whilest the *Female* is full; Nor whilest she is busie in *Sitting* or *Rearing* her *Young*. And therefore it is found by *Experience*, that if you take the *Egges*, or *Young Ones*, out of the *Nests* of *Birds*, they will fall to generate againe, three or foure times, one after another.

759

Of *Living Creatures*, some are *Longer time* in the *wombe*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about six *Moneths*; *Doe's* goe about nine *Moneths*; *Mares* eleuen *Moneths*; *Bitches* nine *Weekes*; *Elephants* are said to goe two *Yeares*; For the Received *Tradition* of ten *Yearers* is *Fabulous*. For *Birds* there is double *Enquiry*; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *EGGE*; And againe betweene the *EGGE Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds*, there is lesse *Diversity* of *Time*, than amongst other *Creatures*; yet some there is: for the *Hen* sitteth but three *Weekes*; The *Turkey-Hen*, *Goose*, and *Duck*, a *Moneth*. *Quare* of others. The *Cause* of the great *Difference* of *Times*, amongst *Living Creatures*, is, Either from the *Nature* of the *Kinde*; Or from the *Constitution* of the *Wombe*. For the former, those that are longer in *Comming* to their *Maturity* or *Growth*, are longer in the *wombe*; As is chiefly seene in *Men*; And so *Elephants* which are long in the *wombe*, are long time in *Comming* to their full *Growth*. But in most other *Kindes*, the *Constitution* of the *Wombe*, (that is, the *Hardnesse* or *Driness* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure *yeares* of *Growth*; And so the *Fawne*; And so the *Calf*. But *Whelps*, which come to their *Growth* (commonly) within three *Quarters* of a *yeare*, are but nine *Weekes* in the *wombe*. As for *Birds*, as there is lesse *Diversity* amongst them, in the time of their *Bringing forth*; So there is lesse *Diversity* in the time of their *Growth*; Most of them *comming* to their *Growth* within a *Twelve-Moneth*.

760

Some *Creatures* bring forth many *Young Ones* at a *Barthen*; As *Bitches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but *One*; As *women*, *Lionesses*, &c. This may be caused either by the *Quantity* of *Sperme* required to the *Producing* One of that *Kinde*; which if lesse bee required, may admit greater *Number*; If more, fewer: Or by the *Partitions* and *Cells* of the *wombe*, which may sever the *Sperme*.

Experiments
in Confort
touching Spe-
cies Visible.

761

There is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things Coloured*. For like as a *Shilling* in the *Bottom* of the *Water*, will shew greater; So will a *Candle* in a *Lansthorne*, in the *Bottom* of the *Water*. I haue heard of a *Practise*, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diner* Diueth, hauing his *Eyes* open, and swimmeth vpon his

Backe,

Backe; whether (I say) he seeth things in the *Aire* greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is plac'd in the *Grosser Medium*, and the *Object* in the *Finer*, how it worketh, know not.

It would be well boulded out, whether great *Refractions* may not bee made vpon *Reflections*, as well as vpon *Direct Beames*. For Example, We see that take an *Empty Basen*, put an *Angell* of *Gold*, or what you will, into it; Then goe so farre from the *Basen*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Basen* with *Water*, and you shall see it out of his Place, because of the *Reflection*. To proceed therefore, put a *Looking-Glasse*, into a *Basen* of *water*; I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not, whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beauty* and *Strangenesse*, were a fine *Prooffe*: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cesterne* or *Poole* of *water*, you shall place ouer against it a *Picture* of the *Deuill*, or what you will, so as you doe not see the *water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Deuils Picture* aside, not seeing the *water*, it will looke like a *Deuill* indeed. They haue an old Tale in *Oxford*, that *Friar Bacon* walked betweene two *Steeple*s: Which was thought to be done by *Glasses*, when he walked vpon the *Ground*.

A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, partly because *Motion* doth discusse the *Torpor* of *Solid Bodies*; Which beside their *Motion* of *Gravity*, haue in them a *Naturall Appetite*, not to moue at all; And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* vpon which it resteth, a stronger *Compression* of *Parts*, than it hath of it Selfe: And therefore needeth more *Force* to be put in *Motion*. For if a *Weighty Body* be *Pensile*, and hang but by a *Thred*, the *Percussion* will make an *Impulsion* very neere as easily, as if it were already in *Motion*.

A *Body* *Ouer great*, or *Ouer small*, will not bee throwne so farre as a *Body* of a *Middle Size*: So that (it seemeth) there must bee a *Commensuration*, or *Proportion*, betweene the *Body Moued*, and the *Force*, to make it moue well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moueth*; and the *Resistance* of the *Body* that is *Moued*: And if the *Body* be *too great*, it yeeldeth too little; And if it be *too small*, it resisteth too little.

It is *Common Experience*, that no *weight* will presse or cut so strong, being laid vpon a *Body*, as *Falling*, or *strucken* from above. It may be the *Aire* hath some part in furthering the *Percussion*: But the chiefe *Cause* I take to be, for that the *Parts* of the *Body Moued*, haue by *Impulsion*, or by the *Motion* of *Gravity continued*, a *Compression* in them, as well downwards, as they haue when they are throwne, or *Shot* thorow the *Aire*, forwards.

762

Experiments
in Consort;
touching Im-
pulsion and Per-
cussion.

763

764

765

forwards. I conceue also, that the quicke *Loose* of that *Motion*, preuenteth the *Resistance* of the *Body* below; And *Priority* of the *Force* (alwaies) is of great *Efficacy*; As appeareth in infinite *Instances*.

Experiment
Solitary touch-
ing *Titila-*
tion.

766

Tickling is most in the *Soles* of the *Feet*, and vnder the *Lyme-Holes*, and on the *Sides*. The *Cause* is, the *Thinness* of the *Skinne* in those *Parts*; Ioyned with the *Rarenesse* of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinness* of the *Skin*, and *Suddenesse*, and *Rarenesse* of *Touch*, doe further: For we see, a *Feather*, or a *Rush* drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuse*, or a *Touch* more *Hard*, doth not. And for *Suddenesse*; We see no *Man* can tickle himselfe: We see also, that the *Palme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not *Ticklish*, because it is accustomed to be *Touched*. *Tickling* also causeth *Laughter*. The *Cause* may be, the *Emission* of the *Spirits*, and so of the *Breath*, by a *Flight* from *Titillation*; For vpon *Tickling*, we see there is euer a *Starting*, or *Shrinking* away of the *Part*, to auoid it; And we see also, that if you *Tickle* the *Nostrills*, with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emission* of the *Spirits*, that doe likewise expell the *Moisture*. And *Tickling* is euer *Painfull*, and not well endured.

Experiment
Solitary touch-
ing the *Scar-*
city of *Raine* in
Egypt.

767

It is strange, that the *River* of *Nilus*, Ouer-flowing as it doth, the *Country* of *Egypt*, there should be neuertheless little or no *Raine* in that *Country*. The *Cause* must be, Either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may be ascribed, either vnto the *Long Race* of the *Water*; For *Swift Running Waters* vapour not so much as *Standing Waters*; Or else to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not so much as *Waters Raw*; No more than *Waters* vpon the *Fire* doe vapour so much, after some time of *Boyling*, as at the first. And it is true, that the *Water* of *Nilus* is sweeter than other *Waters* in *Taste*; And it is excellent Good for the *Stone*, and *Hypochondriacall Melancholy*; Which sheweth it is *Lenefying*: And it runneth thorow a *Countrey* of a *Hot Climate*, and flat, without *Shade*, either of *Woods*, or *Hills*; Whereby the *Sunne* must needs haue great Power to *Concoct* it. As for the *Aire*, (from whence I conceiue this Want of *Showers* commeth chiefly;) The *Cause* must be, for that the *Aire* is, of it selfe, *Thin* and *Thirsty*; And as soone as euer it getteth any *Moisture* from the *Water*, it imbibeth, and dissipateth it, in the whole body of the *Aire*; And suffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment
Solitary touch-
ing *Clarifi-*
cation.

768

It hath beene touched in the *Title* of *Percolations*, (Namely such as *Lare Inwards*;) that the *Whites* of *Egs*, and *Milke*, doe *clarifie*; And it is certaine, that in *Egypt*, they prepare and *clarifie* the *water* of *Nile*, by putting it into great *Jarres* of *Stone*, and *Stirring* it about with a few

Stamped

Stamped *Almonds*; Wherewith they also besmeare the Mouth of the *Vessell*; And to draw it off, after it hath rested some time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beere*, or *Must*, to hasten, and perfect the *Clarifying*.

THere be scarceto be found any *Vegetables*, that haue *Branches*, and no *Leaves*; except you allow *Corall* for one. But there is also in the *Desarts* of *S. Macario* in *Egypt*, a *Plant* which is Long, *Leauelesse*, Browne of Colour, and Branched like *Corall*, saue that it closeth at the *Top*. This being set in *Water* within *House*, spreadeth and displayeth strangely; And the people thereabouts haue a *Superstitious* Beleefe, that in the *Labour* of *women*, it helpeth to the *Easie Deliuernance*.

Experiment
Solitary tou-
ching Plants
without Leaves.

769

THe *CrySTALLINE Venice Glasse*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Paui* by the *Riuer Ticinum*; And the *Ashes* of a weed called by the *Arabs Kall*, which is gathered in a *Desart* betweene *Alexandria* and *Rosetta*; And is by the *Egyptians* vsed first for *Fuell*; And then they crush the *Ashes* into Lumps, like a *Stone*, And so sell them to the *Venerians* for their *Glasse-workes*.

Experiment
Solitary tou-
ching the Ma-
terials of Glasse.

770

IT is strange, and well to be noted, how long *Carkasses* haue continued *Vacorrupt*, and in the former *Dimensions*; As appeareth in the *Mummies* of *Egypt*; Hauing lasted, as is conceiued, (some of them;) three thousand yeeres. It is true, they finde Meanes to draw forth the *Braines*, and to take forth the *Entrailles*, which are the *Parts* aptest to corrupt. But that is nothing to the Wonder; For wee see, what a Soft and Corruptible *Substance* the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seeme, that according to our *Observation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which we conceiue to be so *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that *Haste* to *Corruption*, that is conceiued. And therefore *Bodies* in *Shining-Amber*; In *Quick-Siluer*; In *Balmes*, (whereof we now speake;) In *wax*; In *Honey*; In *Gummes*; And (it may be) in *Conservatories* of *Snow*; &c. are preserved very long. It need not goe for *Repetition*, if we resume againe that which we said in the aforesaid *Experiment*, concerning *Annihilation*; Namely, that if you provide against three *Causes* of *Putrefaction*, *Bodies* will not corrupt: The first is, that the *Aire* be excluded; For that vndermineth the *Body*, and conspireth with the *Spirit* of the *Body* to dissolve it. The Second is, that the *Body* *Adiacent* and *Ambient* be not *Commateriall*, but meerely *Heterogeneall* towards the *Body* that is to be preserved. For if Nothing can be receiued by the One, Nothing can issue from the Other; Such are *Quick-Siluer*, and *white-Amber*, to *Herbs*, and *Flies*, and such *Bodies*. The Third is, that the *Body* to be preserved, be not of that *Grosse*, that it may corrupt within it selfe, although no Part of it issue into the *Body* *Adiacent*: And therefore it must be rather *Thin* and *Small*, than of *Bulke*. There is a Fourth *Remedie* also, which is;

Experiment
Solitary tou-
ching P^{ro}hibi-
tion of Putrefa-
ction, and the
Long Conservati-
on of Bodies.

771

That

That if the *Body* to be preserved be of *Eulke*, as a *Corps* is, then the *Body* that Incloseth it, must haue a *Virtue* to draw forth, and drie the *Moisture* of the *Inward Body*; For else the *Putrifaction* will play within, though nothing issue forth. I remember *Liuy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; whereof the one contained the *Body* of *King Numa*; it being some foure hundred yeares after his *Death*: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Discipline* of the *Pontifess*; And that in the *Coffin* that had the *Bodie*, there was Nothing (at all) to be seen, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Bookes*, they were found as fresh, as if they had beene but newly *Written*, being written in *Parchment*, and couered ouer with *watch-Candles* of *wax*, three or foure fold. By this it seemeth, that the *Romans*, in *Numa's* time, were not so good *Embalmers*, as the *Egyptians* were; Which was the *Cause* that the *Body* was vtterly consumed. But I find in *Plutarch*, and Others, that when *Augustus Caesar* visited the *Sepulchre* of *Alexander the Great*, in *Alexandria*, he found the *Body* to keepe his *Dimension*; But withall, that, notwithstanding all the *Embalming*, (which no doubt was of the best,) the *Body* was so *Tender*, as *Caesar* touching but the *Nose* of it, defaced it. Which maketh mee finde it very strange, that the *Egyptian Mummies* should be reported to be as *Hard* as *Stone-Pitch*: For I finde no difference but one; Which indeed may be very *Materiall*; Namely, that the *Ancient Egyptian Mummies*, were throwded in a *Number* of *Folds* of *Linnen*, belmeared with *Gummes*, in manner of *Seare-Cloth*; Which it doth not appeare was practised vpon the *Body* of *Alexander*.

Experiment
Solitary touching the
Abundance of Nitre
in certaine
Sea-Shoures.

772

Experiment
Solitary touching
Bodies that are borne
vp by Water.

773

NEare the *Castle* of *Catie*, and by the *Wells* of *Assan*, in the *Land* of *Idumea*, a great Part of the *Way*, you would thinke the *Sea* were neare hand, though it be a good distance off: And it is Nothing, but the *Shining* of the *Nitre*, vpon the *Sea Sands*; Such *Abundance* of *Nitre* the *Shores* there doe put forth.

THe *Dead-Sea*, which Vomiteth vp *Eitumen*, is of that *Crafsitude*, as *Liuing Bodies* bound *Hand* and *Foot*, cast into it, haue been borne vp, and not sunke. Which sheweth, that all *Sinking* into *water*, is but an *Ouer-weight* of the *Body*, put into the *water*, in respect of the *water*: So that you may make *water* so strong, and heauy, of *Quick-Siluer*, (perhaps,) or the like, as may beare vp *Iron*: Of which I see no *Vse*, but *Imposture*. We see also, that all *Metalls*, except *Gold*, for the same reason, swimme vpon *Quick-siluer*.

Experiment
Solitary touching
Fuell, that consumeth
little, or nothing.

774

IT is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke Stone*, (whereof *Pilgrims* make *Fires*,) which burneth like a *Coale*, and diminisheth not; But onely waxeth *Brighter* and *Whiter*. That it should doe so, is not strange; For we see *Iron Red* *Hot* burneth, and consumeth not: But the strangeness is, that it should continue any time

time so: For *Iron*, as soone as it is out of the Fire, deadeth straightwaies. Certainly, it were a Thing of great Use, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet last long: Neither am I altogether Incredulous, but there may be such *Candles*, as they say are made of *Salamanders wooll*: Being a Kinde of *Minerall*, which whiteneth also in the Burning, and consumeth not. The *Question* is this, *Flame* must be made of somewhat; And commonly it is made of some *Tangible Body*, which hath *weight*: But it is not impossible, perhaps, that it should be made of *Spirit* or *Vapour*, in a *Body*; (which *Spirit* or *Vapour* hath no *weight*;) such as is the Matter of *Ignis Fatuus*. But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oile* and *wax*, and other *Candle-Staffe*, the *Flame* may continue, and the *wicke* not burne.

Sea-Coale last longer than *Char-Coale*; And *Char-Coale* of *Roots*, being scoaled into great Peeces, last longer than Ordinary *Char-Coale*. *Turfe*, and *Peat*, and *Cow-Sheards*, are cheape *Fuels*, and last long. *Smal-Coale*, or *Briar-Coale*, powred vpon *Char-Coale*, make them last longer. *Sedge* is a cheape *Fuell* to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of *Sea-Coale* with *Earth*, or *Chalke*. For if that *Mixture* be, as the *Sea-Coale-Men* vse it, priuily, to make the Bulke of the *Coale* greater, it is Deceit; But if it be vsed purposely, and be made knowne, it is Sauing.

IT is, at this Day, in vse, in *Gaza*, to couch *Pot-Sheards* or *Vessels* of *Earth*, in their walls, to gather the wind from the Top, and to passe it downe in Spouts into *Roomes*. It is a Deuice for *Freshnesse*, in great Heats: And it is said, there are some *Roomes* in *Italy*, and *Spaine*, for *Freshnesse*, and Gathering the Winds, and *Aire*, in the Heats of *Summer*. But they be but *Pennings* of the winds, and Enlarging them againe, and Making them Reuerberate, and goe round in *Circles*, rather than this Deuice of Spouts in the wall.

THere would be vsed much diligence, in the Choise of some *Bodies*, and *Places*, (as it were) for the Tasting of *Aire*, to discover the *wholesomenesse* or *vnwholesomenesse*, as well of *Seasons*, as of the *Seats* of *Dwellings*. It is certaine, that there be some *Houses*, wherein *Constitutes*, and *Pies*, will gather *Mould*, more than in Others. And I am perswaded, that a *Peece* of *Raw Flesh*, or *Fish*, will sooner corrupt in some *Aires*, than in Others. They be noble *Experiments*, that can make this *Discovery*; For they serue for a *Naturall Diuination* of *Seasons*; Better than the *Astronomers* can by their *Figures*: And againe, they teach *Men* where to chuse their *Dwelling*, for their better *Health*.

THere is a Kind of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *water*, whereof *Cattell* drinke, which maketh them
give

Experiment
Solitary Occo-
nomicall tou-
ching Cheape
Fuell.

775

Experiment
Solitary tou-
ching the Ga-
thering of Wind
for Freshnesse.

776

Experiment
Solitary tou-
ching the Tri-
alls of Aires.

777

Experiment
Solitary tou-
ching Innea-

Expt of Milke in
Milch-Beasts.

778

giue more *Milke*. Surely, there would be some better *Trialls* made of *Mixtures* of *Water* in *Ponds* for *Cattell*, to make them more *Milch*; Or to *Fatten* them; Or to *Keepe* them from *Murraine*. It may be, *Chalke*, and *Nitre*, are of the best.

Experiment
Solitary tou-
ching Sand of
the Nature of
Glasfe.

779

IT is reported, that in the *Valley*, neere the *Mountaine Carmel*, in *Iudea*, there is a *Sand*, which of all other, hath most affinity with *Glasfe*; In-
somuch as other *Minerals*, laid in it, turne to a *Glasfie Substance*, with-
out the *Fire*; And againe *Glasfe* put into it, turneth into the *Mother-Sand*.
The thing is very strange, if it be true: And it is likeliest to be Caused by
some *Naturall Fornace*, or *Heat* in the *Earth*: And yet they doe not speak
of any *Eruption* of *Flames*. It were good to try in *Glasfe-workes*, whether
the *Crude Materials* of *Glasfe*, mingled with *Glasfe*, already made, and
Re-moulten, doe not facilitate the *Making* of *Glasfe* with lesse *Heat*.

Experiment
Solitary tou-
ching the
Growth of Co-
rall.

780

IN the *Sea*, vpon the *South-west* of *Sicily*, much *Corall* is found. It is a
Sub-Marine Plant. It hath no *Leaues*: It brancheth only when it is vn-
der *Water*; It is *Soft*, and *Greene* of *Colour*; But being brought into the
Aire, it becommeth *Hard*, and *Shining Red*, as wee see. It is said also,
to haue a *white Berry*, But we finde it not brought ouer with the *Corall*.
Belike it is cast away as nothing worth: Inquire better of it, for the *Dis-
couery* of the *Nature* of the *Plant*.

Experiment
Solitary tou-
ching the Ga-
thering of
Manna.

781

THE *Manna* of *Calabria* is the best, and in most *Plenty*. They gather
it from the *Leafe* of the *Mulberry Tree*; But not of such *Mulberrie
Trees*, as grow in the *Valley's*. And *Manna* falleth vpon the *Leaues* by
Night, as other *Dewes* do. It should seeme, that before those *Dewes* come
vpon *Trees*, in the *Valley's*, they dissipate, and cannot hold out. It should
seeme also, the *Mulberry-Leafe*, it selfe, hath some *Coagulating Vertue*,
which inspissateth the *Dew*, for that it is not found vpon other *Trees*:
And wee see by the *Silke-worme*, which feedeth vpon that *Leafe*, what a
Dainty Smooth Iuyce it hath; And the *Leaues* also, (especially of the
Blacke Mulberry,) are somewhat *Bristly*, which may helpe to preserue
the *Dew*. Certainly, it were nor amisse, to obserue a little better, the
Dewes that fall vpon *Trees*, or *Herbs*, Growing on *Mountaines*; For it may
be, many *Dewes* fall, that spend before they come to the *Valleyes*. And I
suppose, that he that would gather the best *May-Dew* for *Medicine*,
should gather it from the *Hills*.

Experiment
Solitary tou-
ching the Cor-
recting of Wine.

782

IT is said, they haue a manner, to prepare their *Greek-Wines*, to keepe
them from *Fuming*, and *Inebriating*, by adding some *Sulphur*, or *Allome*.
Whereof the one is *Vntuous*, and the other is *Astringent*. And certaine
it is, that those two *Natures* doe best repress *Fumes*. This *Experiment*
would be transferred, vnto other *Wine*, and *Strong Beere*, by Putting in
some like *Substances*, while they worke; Which may make them both
to *Fume* lesse, and to *Inflame* lesse.

[T is conceived by some, (not improbably,) that the reason, why *wild-fires*, (whereof the principall Ingredient is *Bitumen*;) doe not quench with *water*, is, for that the first *Concretion* of *Bitumen* is a *Mixture* of a *very*, and *watry Substance*: So is not *Sulphur*. This appeareth, for that in the *Place* neare *Puteoli*, which they call the *Court of Vulcan*, you shall heare, vnder the *Earth*, a Horrible Thundring of *Fire*, and *water*, conlicting together: And there breake forth also *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*; Whereas *Aetna*, and *Vesuvius*, and the like, which consist vpon *Sulphur*, shoot forth *smoake*, and *Ashes*, and *Pumice*, but no *water*. It is reported also, that *Bitumen* Mingled with *Lime*, and Put vnder *Water*, will make, as it were, an *Artificiall Rocke*; The *Substance* becommeth so Hard.

Here is a *Cement* compounded of *Floure*, *whites* of *Egges*, and *Stone* *powdred*, that becommeth Hard as *Marble*; wherewith *Piscina mirabilis*, neare *Cuma*, is said to haue the *Walls* Plattered. And it is certaine, and tried, that the *Powder* of *Load-Stone*, and *Flint*, by the Addition of *whites* of *Egges*, and *Gum-Dragon*, made into *Paste*, will in a few dayes harden to the Hardnesse of a *Stone*.

[T hath beene noted by the *Ancients*, that in *Full* or *Impure Bodies*, *Vlcers* or *Hurts* in the *Legs*, are Hard to Cure; And in the *Head* more Easie. The *Cause* is, for that *Vlcers* or *Hurts* in the *Legs* require *Desiccation*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Vlcers* in the *Head* require it not; But contrariwise *Driness* maketh them more apt to Consolidate. And in *Moderne* Obseruation, he like difference hath beene found, betweene *French-Men*, and *English-Men*; Whereof the ones *Constitution* is more *Drie*, and the others more *Moist*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-Man*, and of the *Leggs* in an *English-Man*.

[T hath beene noted by the *Ancients*, that *Southerne Winds*, blowing much, without *Raine*, doe cause a *Fenourous Disposition* of the *Yeare*; But with *Raine*, not. The *Cause* is, for that *Southerne Winds* doe, of themselves, qualifie the *Aire*, to be apt to cause *Fewers*; But when *Showers* are ioyned, they doe Refrigerate in Part, and Checke the Sultry *Heat* of the *Southerne Wind*. Therefore this holdeth not in the *Sea-Coasts*, because the *Vapour* of the *Sea*, without *Showers*, doth refresh.

[T hath beene noted by the *Ancients*, that *wounds* which are made with *Brasse*, heale more easly, than *wounds* made with *Iron*. The *Cause* is, for that *Brasse* hath, in it selfe, a *Sanative Vertue*; And so in the very Instant helpeth somewhat: But *Iron* is *Corrosive*, and not *Sanative*. And therefore it were good, that the Instruments which are vsed by *Chirurgians* about wounds, were rather of *Brasse*, than *Iron*.

Experiment
Solitary touching the
Materials of *wild-fires*.

783

Experiment
Solitary touching Plaster
growing as
Hard as *Marble*.

784

Experiment
Solitary touching Indurment of the
Cure in some
Vlcers and
Hurts.

785

Experiment
Solitary touching the
Healfulnesse
or Vnhealfulnesse of the
Southerne Wind.

786

Experiment
Solitary touching Wounds.

787

In

Experiment
Solitary tou-
ching Mortifi-
cation by Cold.

788

IN the Cold Countries, when Mens *Noses* and *Eares* are Mortified, and (as it were) Gangrened with Cold, if they come to a Fire, they rot off presently. The Cause is, for that the few *Spirits*, that remaine in those *Parts*, are suddenly drawne forth, and so *Putrifaction* is made Compleat. But *Snow* Put vpon them, helpeth; For that it preserueth those *Spirits*, that remaine, till they can reuiue; And besides, *Snow* hath in it a Secret *Warmth*: As the *Monke* proued out of the *Text*; *Qui dat Ninem sicut Lanam, Gelu sicut Cineres spargit*. Whereby he did inferre, that *Snow* doth warme like *Wooll*, and *Frost* did fret like *Asbes*. warme *water* also doth good; Because by little and little it openeth the Pores, without any sudden Working vpon the *Spirits*. This Experiment may bee transferred vnto the Cure of *Gangrenes*, either Comming of themselves, or induced by too much Applying of *Opiates*: Wherein you must beware of *Drie Heat*, and resort to Things that are *Refrigerant*, with an Inward *Warmth*, and *Vertue* of Cherishing.

Experiment
Solitary tou-
ching Weight.

789

WEigh *Iron*, and *Aqua Fortis*, seuerally; Then dissolve the *Iron* in the *Aqua Fortis*: And weigh the *Dissolution*; And you shall finde it to beare as good *Weight*, as the *Bodies* did seuerally: Notwithstanding a good deale of *Waste*, by a thicke *Vapour*, that issueth during the working: Which sheweth that the opening of a *Body*, doth increase the *weight*. This was tried once, or twice, but I know not, whether there were any *Error*, in the *Triall*.

Experiment
Solitary tou-
ching the Su-
per-Natation of
Bodies.

790

TAke of *Aqua-Fortis* two Ounces, of *Quick-siluer* two Drachmes; (For that Charge the *Aqua-Fortis* will beare;) The *Dissolution* will not beare a *Flint*, as big as a *Nutmeg*: Yet (no doubt) the Increasing of the *weight* of *water*, will increase his *Power* of *Bearing*; As wee see *Broome*, when it is Salt enough, will beare an *Edge*. And I remember well a *Physician*, that vsed to giue some Minerall *Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe so easily, as in Ordinary *Water*. But it seemeth, the *weight* of the *Quick-siluer*, more than the *Weight* of a *Stone*; doth not compense the *Weight* of a *Stone*, more than the *weight* of the *Aqua-Fortis*.

Experiment
Solitary tou-
ching the Fly-
ing of Vnequall
Bodies in the
Aire.

791

LET there be a *Body* of *Vnequall Weight*; (As of *wood* and *Lead*, or *Born* and *Lead*;) If you throw it from you with the *Light-End* forward it will turne, and the *weightier End* will recover to be Forwards; Vnlesse the *Body* be Over-long. The Cause is, for that the more *Dense Body*, hath a more Violent *Pressure* of the *Parts*, from the first *Impulsion*; Which is the Cause, (though heretofore not found out, as hath beene often said, of all *Violent Moions*: And when the *Hinder Part* moueth swifter, (for that it lesse endureth *Pressure* of *Parts*;) than the *Forward Part* can make way for it, it must needs be, that the *Body* turne over: For (turned) it can more easily draw forward the *Lighter Part*. *Galileus* noteth it well: That if an *Open Trough*, wherein *water* is, be driuen faster than the *water*, they are

can follow, the *water* gathereth vpon an heape, towards the *Hinder End*, where the *Motion* began; Which he supposeth, (holding confidently the *Motion* of the *Earth*), to be the *Cause* of the *Ebbing* and *Flowing* of the *Ocean*; Because the *Earth* ouer-runne the *water*. Which *Theory*, though it be false, yet the first *Experiment* is true. As for the *Inequality* of the *Pressure* of *Parts*, it appeareth manifestly in this; That if you take a *Body* of *Stone*, or *Iron*, and another of *Wood*, of the same *Magnitude*, and *Shape*, and throw them with equall *Force*, you cannot possibly throw the *wood*, so farre, as the *Stone*, or *Iron*.

IT is certaine, (as it hath beene formerly, in part, touched,) that *water* maybe the *Medium* of *Sounds*. If you dash a *Stone* against a *Stone* in the *Bottom* of the *water*, it maketh a *Sound*. So a long *Pole* strucke vpon *Gravell*, in the *Bottom* of the *water*, maketh a *Sound*. Nay, if you should thinke that the *Sound* commeth vp by the *Pole*, and not by the *water*, you shall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no *Solid Body*, whereby the *Sound* can ascend.

Experiment
Solitary touching
water,
that it may bee
the *Medium* of
Sounds.

792

ALL *Obiects* of the *Senses*, which are very *Offensive*, do cause the *Spirits* to retire; And vpon their *Flight*, the *Parts* are (in some degree) destitute; And so there is induced in them a *Trepidation* and *Horror*. For *Sounds*, we see that the *Grating* of a *Saw*, or any very *Harsh Noise*, will set the *Teeth* on edge, and make all the *Body* shiuer. For *Tastes*, we see that in the *Taking* of a *Potion*, or *Pils*, the *Head* and the *Necke* shake. For *Odious Smells*, the like *Effect* followeth, which is lesse perceined, because there is a *Remedy* at hand, by *Stopping* of the *Nose*. But in *Horses*, that can vse no such *Helpe*, we see the *Smell* of a *Carrion*, especially of a *Dead Horse*, maketh them flie away, and take on, almost as if they were *Mad*. For *Feeling*, if you come out of the *Sunne*, suddenly, into a *Shade*, there followeth a *Chilnesse*, or *Shiuering* in all the *Body*. And euen in *Sight*, which hath (in effect) no *Odious Obiect*, *Comming* into *Sudden Darknesse*, induceth an *Offer* to *Shiuer*.

Experiment
Solitary of the
Flight of the
Spirits vpon *Odious Obiects*.

793

THere is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath *Windows* only from above: It is in *Length* an *Hundred Feet*, in *Breadth* *Twenty Feet*, and in *Height* neere *Fifty*, Hauing a *Doore* in the *Middest*. It reporteth the *Voice*, twelve, or thirteene times, if you stand by the *Glose End-wall*, ouer against the *Doore*. The *Eccho* faderh and dyeth by little and little, as the *Eccho* at *Pont-charenton* doth. And the *Voice* soundeth, as if it came from above the *Doore*. And if you stand at the *Lower End*, or on either *Side* of the *Doore*, the *Eccho* holdeth. But if you stand in the *Doore*, or in the *Middest* iust ouer against the *Doore*, not. Note that all *Eccho's* sound better against *Old walls*, than *New*; Because they are more *Dry* and *Hollow*.

Experiment
Solitary touching the
Super-Reflection
of *Eccho's*.

794

S

Those

Experiment
Solitary tou-
ching the Force
of Imagination,
Imitating that
of the Sense.

795

THose Effects, which are wrought by the Percussion of the Sense, and by Things in Fact, are produced likewise in some degree, by the Imagination. Therefore if a Man see another eat *Sowre* or *Acide Things*, which set the Teeth on edge, this Object tainteth the Imagination. So that he that seeth the Thing done by another, hath his owne Teeth also set on edge. So if a Man see another turne swiftly, and long; Or if hee looke vpon wheeles that turne, Himselfe waxeth Turne-sicke. So if a Man bee vpon an *High Place*, without Railes, or good Hold, except he be vsed to it, he is Ready to Fall: For Imagining a Fall, it putteth his Spirits into the very Action of a Fall. So Many vpon the Seeing of others Bleed, or Strangled, or Tortured, Themselves are ready to faint, as if they Bled, or were in Strife.

Experiment
Solitary tou-
ching Preserua-
tion of Bodies.

796

TAke a *Stock-Gilly-Flower*, and tie it gently vpon a Sticke, and put them both into a *Stoop-Glasse*, full of *Quick-siluer*, so that the Flower be couered: Then lay a little Weight vpon the Top of the Glasse, that may keepe the Sticke downe; And look vpon them after foure or fise daies; And you shall finde the Flower Fresh, and the Stalke Harder, and lesse Flexible than it was. If you compare it with another Flower, gathered at the same time, it will be the more manifest. This sheweth, that Bodies doe preserue excellently in *Quick-siluer*, And not preserue only, but, by the Coldnesse of the *Quick-siluer*, Indurate; For the Freshnesse of the Flower may be meerely Conservation; (which is the more to be obserued, because the *Quick-siluer* presseth the Flower;) But the Stiffenesse of the Stalke cannot be without Induration, from the Cold (as it seemeth,) of the *Quick-siluer*.

Experiment
Solitary tou-
ching the
Growib, or
Multiplying of
Metals.

797

IT is reported by some of the Ancients, that in *Cyprus*, there is a Kinde of *Iron*, that being cut into Little Peeces, and put into the Ground, if it be well Watred, will increase into Greater Peeces. This is certaine, and knowne of Old; That Lead will multiply, and Increase; As hath beene seene in Old Statua's of Stone, which haue beene put in Cellars; The Feet of them being bound with Leaden Bands; Where (after a time) there appeared, that the Lead did swell; Insomuch as it hanged vpon the Stone like warts.

Experiment
Solitary tou-
ching the
Drowning of
the more Base
Metall in the
more Precious.

798

I Call Drowning of Metals, when that the *Easer Metall*, is so incorporate with the more Rich, as it can by no meanes be separated againe: which is a kinde of Version, though False: As if *Siluer* should be inseparably incorporated with *Gold*, Or *Copper*, and *Lead*, with *Siluer*. The Ancient *Electrum* had in it a Fifth of *Siluer* to the *Gold*; And made a Compound Metall, as fit for most vses, as *Gold*; And more Resplendent, and more Qualified in some other Properties; But then that was easily Separated. This to doe priuily, or to make the Compound passe for the Rich Metall Simple, is an Adulteration, or Counterfeiting: But if it be done Auowedly, and without Disguizing, it may be a great Saving of the

the *Richer Metall*. I remember to haue heard of a Man, skilfull in *Metals*, that a Fifteenth Part of *Siluer*, incorporate with *Gold*, will not be Recovered by any *water of Separation*; Except you put a Greater *Quantitie* of *Siluer*, to draw to it the Lesse; which (he said) is the last Refuge in *Separations*. But that is a tedious way, which no Man (almost) will thinke on. This would be better enquired; And the *Quantitie* of the Fifteenth turned to a Twentieth; And likewise with some little *Additionall*, that may further the *Intrinsique Incorporation*. Note that *Siluer* in *Gold* will be detected by *weight*, compared with the *Dimension*; But *Lead* in *Siluer*, (*Lead* being the *weightier Metall*;) will not bee detected; If you take so much the more *Siluer*, as will counteruaile the *Ouer-weight* of the *Lead*.

Gold is the only *Substance*, which hath nothing in it *Volatile*, and yet melteth without much difficulty. The *Melting* sheweth that it is not leiuine, or Scarce in *Spirit*. So that the *Fixing* of it, is not want of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Close Conseruation* of them: Whereby they haue the lesse Appetite, and no meanes (at all) to issue forth. It were good therefore to try, whether *Glassè Re-Moulten* doe leese any *weight*? For the *Parts* in *Glassè* are euenly Spred; But they are not so Close as in *Gold*; As wee see by the Easie Admission of *Light*, *Heat*, and *Cold*; And by the *Smalnessè* of the *Weight*. There bee other *Bodies*, *Fixed*, which haue little or no *Spirit*: So as there is nothing to fly out; As wee see in the *Stuffe*, whereof *Copples* are made; Which they put into *Furnaces*; Vpon which *Fire* worketh not: So that there are three *Causes* of *Fixation*; The Euen *Spreading* both of the *Spirits*, and *Tangible Parts*; The *Closenessè* of the *Tangible Parts*; And the *Ieiunenessè* or *Extreme Comminution* of *Spirits*: Of which Three, the Two First may be ioyned with a *Nature Liquefiable*; The Last not.

IT is a Profound *Contemplation* in *Nature*, to consider of the *Emptinessè* (as we may call it) or *Insatiation* of seuerall *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is most manifest, that it doth it, with a kinde of Thirst, as not satisfied with his owne former Consistence; For else it would never receiue them in so suddenly, and easily. *water* and all *Liquors*, doe hastily receiue *Dry* and more *Terrestriall Bodies*, Proportionable: And *Dry Bodies*, on the other side, drinke in *Waters*, and *Liquors*: So that, (as it is well said, by one of the *Ancients*, of *Earthly* and *watry Substances*;) One is a *Glue* to another. *Parchment*, *Skins*, *Cloth*, &c. drinke in *Liquors*, though themselves be *Entire Bodies*, and not *Comminuted*, as *Sand* and *Ashes*; Not apparently *Porous*: *Metals* themselves doe receiue in readily *Strong-waters*; And *Strong-waters* likewise doe readily pierce into *Metals*, and *Stones*: And that *Strong-water* will touch vpon *Gold*, that will not touch vpon *Siluer*; And *e-conuerso*. And *Gold*, which

Experiment
Solitary touching
Fixation
of Bodies.

1799

Experiment
Solitary touching the
Restless Nature of
Things in
Themselves, and
their Desire to
change.

800



NATVRALL HISTORIE.

IX. Century.



U is certaine, that all *Bodies* whatsoeuer, though they haue no *Sense*, yet they haue *Perception* : For when one *Body* is applied to another, there is a *Kinde of Election*, to embrace that which is *Agreeable*, and to exclude or expell that which is *Ingrate* : And whether the *Body* bee *Alterant*, or *Altered*, euermore a *Perception* precedeth *Operation* : For else all *Bodies* would be alike *One to Another*. And somerimes this *Perception* in some *Kinde of Bodies*, is farre more *Subtill* than the *Sense* ; So that the *Sense* is but a dull *Thing* in *Comparison* of it : Wee see a *Weather-Glasse*, will finde the least difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* also, is somerimes at *Distance*, as well as vpon the *Touch* ; As when the *Load-Stone* draweth *Iron* ; or

Experiments
in Consort,
touching Per-
ception in Bodies
Insensible, ten-
ding to Natural
Dissipation, or
Subtill Trials.

Flame fireth Naphtha of Babylon, a great distance off. It is therefore a Subject of a very Noble Enquiry, to enquire of the more Subtill Perceptions; For it is another Key to open Nature, as well as the Sense; And sometimes Better. And besides, it is a Principall Meanes of Naturall Diuination, For that which in these Perceptions appeareth early, in the great Effects commeth long after. It is true also, that it serueth to discover that which is Hid, as well as to foretell that which is to Come; As it is in many Subtill Trialls; As to try whether Seeds be old, or new, the Sense cannot informe: But if you boile them in Water, the New Seeds will sprout sooner: And so of Water, the Taste will not discover the best Water; But the Speedy Consuming of it, and many other Meanes which we haue heretofore set downe, will discover it. So in all Phytognomy, the Lineaments of the Body will discover those Naturall Inclinations of the Minde, which Dissimulation will conceale, or Discipline will suppress. Wee shall therefore now handle only, those two Perceptions, which pertaine to Naturall Diuination, and Discovery: Leauing the Handling of Perception in other Things to be disposed Elsewhere. Now it is true, that Diuination is attained by other Meanes; As if you know the Causes; If you know the Concomitants; you may iudge of the Effect to follow: And the like may be said of Discovery; But we tie our Selues here, to that Diuination and Discovery chiefly, which is Caused by an Early, or Subtill Perception.

The Aptnesse or Propension of Aire, or Water, to Corrupt or Putrifie, (no doubt,) is to be found before it breaketh forth into manifest Effects of Diseases, Blastings, or the like. Wee will therefore set downe some Prognosticks of Pestilentiall and Vnwholesome Yeares.

801

The wind blowing much from the South, without Raine; And wormes in the Oake-Apple; haue beene spoken of before. Also the Plenty of Frogs, Grasshoppers, Flies, and the like Creatures bred of Putrifaction, doth portend Pestilentiall Yeares.

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Great, and Early Heats in the Spring, (and namely in May,) without Winds, portend the same; And generally so doe Yeares with little wind, or Thunder.

Great

Great Droughts in Summer, lasting till towards the End of August, and some Gentle Showers vpon them; And then some Drie weather againe; Doe portend a Pestilent Summer, the Yeare following: For about the End of August, all the Sweetnesse of the Earth, which goeth into Plants, and Trees is exhaled; (And much more if the August be drie,) So that nothing then can breathe forth of the Earth, but a grosse Vapour, which is apt to Corrupt the Aire: And that Vapour, by the first Showers, if they be Gentle, is released, and commeth forth abundantly. Therefore they that come abroad soone after those Showers, are commonly taken with Sicknesse: And in Affricke, no Bodie will stirre out of doores, after the first Showers. But if the Showers come vehemently, then they rather wash and fill the Earth, than giue it leaue to breathe forth presently. But if Dry weather come againe, then it fixeth and continueth the Corruption of the Aire, vpon the first Showers begun; And maketh it of ill Influence, euen to the Next Summer; Except a very Frosty Winter discharge it, Which seldome succeedeth such Droughts.

The Lesser Infections, of the Small Pockes, Purple Feuers, Agues, in the Summer Precedent, and houering all winter, doe portend a great Pestilence in the Summer following; For Putrifaction doth not rise to his heighth at once.

It were good to lay a Peece of Raw Flesh, or Fish, in the Open Aire; And if it Putrifie quickly, it is a Signe of a Disposition in the Aire to Putrifaction. And because you cannot be informed, whether the Putrifaction be quicke or late, except you compare this Experiments with the like Experiment in another Yeare, it were not amisse, in the same Yeare, and at the same Time, to lay one Peece of Flesh, or Fish, in the Open Aire, and another of the same Kinde and Bignesse, within Doores: For I iudge, that if a generall Disposition be in the Aire to Putrifie, the Flesh, or Fish, will sooner Putrifie abroad, where the Aire hath more power, than in the House, where it hath lesse, being many wayes corrected. And this Experiment would be made about the End of March: For that Season is likeliest to discouer, what the Winter hath done; And what the Summer following will doe vpon the Aire. And because the Aire (no doubt) receiueth great Tincture, and Infusion from the Earth; It were good to trie that Exposing of Flesh, or Fish, both vpon a Stake of wood, some heighth aboue the Earth, and vpon the Flat of the Earth.

Take May Dew, and see whether it putrifie quickly, or no? For that likewise may disclose the Qualitie of the Aire, and Vapour of the Earth, more or lesse Corrupted.

A Drie March, and a Drie May, portend a Wholesome Summer, if there be a Showring Aprill betweene: But otherwise, it is a Signe of a Pestilentiall Yeare.

As the Discovery of the Disposition of the Aire, is good for the Prognostickes of wholesome, and Unwholesome Yeares; So it is of much more vse, for the Choice of Places to dwell in: At the least, for Lodges, and Retiring Places for Health; (For Mansion Houses respect Prouisions, as well

as

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as *Health*; Wherein the *Experiments* aboue mentioned may serue.

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But for the *Choice* of *Places*, or *Seats*, it is good to make *Triall*, not onely of *Aptnesse* of *Aire* to corrupt, but also of the *Moisture* and *Driness* of the *Aire*; and the *Temper* of it, in *Heat*, or *Cold*; For that may concerne *Health* diuerfly. We see that there be some *Houses*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others; And *wainscots* will also sweat more; so that they will almost run with *water*: All which, (no doubt,) are caused chiefly by the *Moistnesse* of the *Aire*, in those *Seats*. But because it is better to know it, before a *Man* buildeth his *House*, than to finde it after, take the *Experiments* following.

810

Lay *wooll*, or a *Sponge*, or *Bread*, in the *Place* you would try, comparing it with some other *Places*; And see whether it doth not moisten, and make the *wooll*, or *Sponge*, &c. more *Ponderous*, than the other? And if it doe, you may iudge of that *Place*, as Situate in a *Grosse*, and *Moist Aire*.

811

Because it is certaine, that in some *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *woods*, and *Hills*, the *Aire* is more *Vnequall*, than in Others; And *Inequality* of *Aire* is euer an *Enemy* to *Health*; It were good to take two *weather-Glasses*, *Matches* in all things, and to set them for the same *Houres* of *One day*, in seuerall *Places* where no *Shade* is, nor *Enclosures*: And to marke when you set them, how farre the *water* commeth; And to compare them, when you come againe, how the *water* standeth then: and if you finde them *Vnequall*, you may be sure that the *Place* where the *water* is lowest, is in the *warmer Aire*, and the other in the *Colder*. And the greater the *Inequality* bee, of the *Ascens*, or *Descent* of the *water*, the greater is the *Inequality* of the *Temper* of the *Aire*.

812

The *Predictions* likewise of *Cold* and *Long Winters*, and *Hot* and *Dry Summers*, are good to be knowne; As well for the *Discovery* of the *Causes*, as for diuers *Provisions*. That of *Plenty* of *Hawes*, and *Heps*, and *Briar-Berries*, hath beene spoken of before. If *Wainscot*, or *Stone*, that haue vsed to *Sweat*, be more dry, in the *Beginning* of *Winter*; Or the *Drops* of the *Eanes* of *Houses* come more slowly downe, than they vse; it portendeth a *Hard*, and *Frosty Winter*. The *Cause* is, For that it sheweth an *Inclination* of the *Aire*, to *Dry Weather*; which in *winter* is euer ioyned with *Frost*.

813

Generally, a *Moist* and *Cool* *Summer*, portendeth a *Hard Winter*. The *Cause* is, for that the *Vapours* of the *Earth*, are not dissipated in the *Summer* by the *Sunne*; And so they rebound vpon the *winter*.

814

A *Hot* and *Dry Summer*, and *Autumne*, and especially if the *Heat* and *Drought* extend farre into *September*, portendeth an *Open Beginning* of *winter*; And *Colds* to succeed, toward the latter Part of the *Winter*, and the *Beginning* of the *Spring*: For till then, the former *Heat* and *Drought* beare the *Sway*; And the *Vapours* are not sufficiently *Multiplied*.

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An *Open* and *warne Winter* portendeth a *Hot* and *Dry Summer*: For the *Vapours* disperse into the *Winter Showers*; Whereas *Cold* and *Frost* keepeth

keepeth them in, and transporteth them into the late *Spring*, and *Summer* following.

Birds that vse to change *Countries*, at certaine *Seasons*, if they come Earlier, doe shew the *Temperature* of *weather*, according to that *Countrey* whence they came: As the *Winter-Birds*, (namely *Woodcocks*, *Feldefares*, &c.) if they come earlier, and out of the *Northerne Countries*, with vs shew *Cold Winters*. And if it be in the same *Countrey*, then they shew a *Temperature* of *Season*, like vnto that *Season* in which they come: As *Swallows*, *Bats*, *Cuckoos*, &c. that come towards *Summer*, if they come early, shew a *Hot Summer* to follow.

The *Prognostickes*, more Immediate, of *weather* to follow soone after, are more Certaine than those of *Seasons*. The *Resounding* of the *Sea* vpon the *shoare*; And the *Murmur* of *Winds* in the *woods*, without apparent *Wind*; shew *wind* to follow: For such *Winds*, breathing chiefly out of the *Earth*, are not at the first perceiued, except they bee pent, by *Water*, or *wood*. And therefore a *Murmur* out of *Canes* likewise portendeth as much.

The *Vpper Regions* of the *Aire*, perceiue the *Collection* of the *Matter* of *Tempest*, and *winds*, before the *Aire* here below: And therefore the *Obscuring* of the *Smaller Starres* is a *Signe* of *Tempests* following. And of this kinde you shall finde a *Number* of *Instances* in our *Inquisition De Ventis*.

Great Mountaines haue a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valley's* or *Plaines* below: And therefore they say in *wales*, when certaine *Hills* haue their *Night-Caps* on, they meane *Mischiefe*. The *Cause* is, for that *Tempests*, which are for the most Part bred aboue, in the *Middle Region*, (as they call it,) are soonest perceiued to collect in the *Places* next it.

The *Aire*, and *Fire*, haue *Subrill Perceptions* of *wind Rising*, before *Men* finde it. We see the *Trembling* of a *Candle* will discouer a *wind* that otherwise wee doe not feelee; And the *Flexuous Burning* of *Flames* doth shew the *Aire* beginneth to be vnquiet; And so doe *Coales* of *Fire* by *Casting* off the *Ashes* more than they vse. The *Cause* is, for that no *wind*, at the first, till it hath strooke and driuen the *Aire*, is Apparent to the *Sense*: But *Flame* is easier to moue, than *Aire*: And for the *Ashes*, it is no maruell, though *Wind* unperceiued shake them off; For wee usually trie, which way the *wind* bloweth, by casting vp *Grasse*, or *Chaffe*, or such light Things, into the *Aire*.

When *wind* expireth from vnder the *Sea*; As it causeth some *Resounding* of the *water*, (whereof wee spake before,) so it causeth some *Light Motions* of *Bubbles*, and *White Circles* of *Froth*. The *Cause* is, for that the *wind* cannot be perceiued by the *Sense*, vntill there bee an *Eruption* of a great *Quantitie*, from vnder the *water*; And so it getteth into a *Bodie*: Whereas in the first *Putting vp* it commeth in little *Portions*.

We spake of the *Ashes*, that *Coales*, cast off; And of *Grasse*, and *Chaffe* carried by the *Wind*; So any *Light Thing* that moueth, when we finde no

wind,

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wind, sheweth a Wind at hand; As when Feathers, or Downe of Thistles, fly to and fro in the Aire.

For Prognostickes of Weather from Liuing Creatures, it is to be noted; That Creatures that Liue in the Open Aire, (*Sub Diò*,) must needs haue a Quicker Impression from the Aire, than Men that liue most within Doores; And especially Birds, who liue in the Aire, freest, and clearest; And are aptest by their Voyce, to tell Tales, what they finde; And likewise by the Motion of their Flight to expresse the same.

823

Water-Fowles, (as *Sea-Gulls*, *More-Hens*, &c.) when they flocke and fly together, from the *Sea* towards the *Shoares*, And contrariwise, *Land-Birds*, (as *Crowes*, *Swallows*, &c.) when they fly from the *Land* to the *waters*, and beat the *waters* with their *wings*; doe fore-shew *Raine*, and *wind*. The Cause is, *Pleasure*, that both Kinde take in the *Moistnesse*, and *Densitie* of the Aire: And so desire to be in *Motion*, and vpon the wing, whither soever they would otherwise goe: For it is no Maruell, that *water-Fowle* doe ioy most in that Aire, which is likest *water*; And *Land-Birds* also, (many of them,) delight in *Bathing*, and *Moist Aire*. For the same Reason also, many *Birds* doe proine their *Feathers*; And *Geese* doe gaggle; And *Crowes* seeme to call vpon *Raine*: All which is but the Comfort they seeme to receiue in the *Relenting* of the Aire.

824

The *Heron*, when shee soareth high, (so as sometimes shee is seene to passe ouer a *Cloud*,) sheweth *winds*: But *Kites* flying aloft, shew *Faire* and *Drie weather*. The Cause may bee, for that they both mount most into the Aire, of that Temper, wherein they delight: And the *Heron*, being a *water-Fowle*, taketh pleasure in the Aire, that is *Condensed*: And besides, being but *Heauie* of wing, needeth the Helpe of the *Grosser Aire*. But the *Kite* affecteth not so much the *Grossenesse* of the Aire, as the *Cold* and *Freshnesse* thereof: For being a *Bird of Prey*, and therefore *Hot*, shee delighteth in the *Fresh Aire*; And (many times) flyeth against the *wind*; As *Trouts*, and *Salmons* swimme against the *Streame*. And yet it is true also, that all *Birds* finde an Ease in the depth of the Aire; As *Swimmers* doe in a *Deepe water*. And therefore when they are aloft, they can vphold themselues with their *wings Spred*, scarce mouing them.

825

Fishes, when they play towards the *Top* of the *water*, doe commonly foretell *Raine*. The Cause is, for that a *Fish* hating the *Drie*, will not approach the Aire, till it groweth *Moist*; And when it is *Drie*, will fly it, and swimme Lower.

826

Beasts doe take Comfort, (generally,) in a *Moist Aire*; And it maketh them eat their *Meat* better: And therefore *Sheepe* will get vp betimes in the Morning, to feed, against *Raine*: And *Cattell*, and *Deere*, and *Cornegies*, will feed hard before *Raine*: And a *Heifer*, will put vp his *Nose*, and snuffe in the Aire, against *Raine*.

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The *Trifoile*, against *Raine*, swelleth in the *Stalke*; and so standeth more vpright; For by *wet*, *Stalkes* doe erect, and *Leaves* bow downe. There is a Small Red *Flower* in the *Stubble-Fields*. which Country People call the *Wincopipe*; Which if it open in the *Morning*, you may be sure of a faire *Day* to follow.

Euen in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieue, either towards *Raine*, or towards *Frost*: For the one maketh the *Humours* more to Abound; And the Other maketh them Sharper. So we see both *Extremes* bring the *Gout*.

Wormes, *Vermine*, &c. doe fore-shew (likewise) *Raine*: For *Earth-wormes* will come forth, and *Moules* will cast vp more, and *Fleas* bite more, against *Raine*.

Solide Bodies likewise fore-shew *Raine*. As *Stones*, and *Wainscot*, when they *Sweat*: And *Boxes*, and *Pegs* of *wood*, when they *Draw*, and *winde hard*; Though the former be but from an outward Cause; For that the *Stone*, or *Wainscot*, turneth and beateth backe the *Aire* against it selfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it selfe.

Appetite is moued chiefly by Things that are *Cold*, and *Drie*: The Cause is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth vpon Supply; And so is *Drinesse*: And therefore all *Soure Things*, as *Vinegar*, *Iuyce* of *Lemons*, *Oyle* of *Vitrioll*, &c.) prouoke *Appetite*. And the *Disease*, which they call *Appetitus Caninus*, consisteth in the Matter of an *Acide* and *Glasie Elegme*, in the *Mouth* of the *Stomach*. *Appetite* is also moued by *Soure Things*; For that *Soure Things*, induce a *Contraction* in the *Nerves*, placed in the *Mouth* of the *Stomach*; Which is a great Cause of *Appetite*. As for the Cause, why *Onions*, and *Salt*, and *Pepper*, in Baked Meats, moue *Appetite*, it is by *Vellication* of those *Nerves*; For *Motion* whetteth. As for *Worme-wood*, *Olines*, *Capers*, and others of that kinde, which participate of *Bitternesse*, they moue *Appetite* by *Absterfion*. So as there be foure Principall Causes of *Appetite*; The *Refrigeration* of the *Stomach*, ioyned with some *Drinesse*; *Contraction*; *Vellication*; And *Absterfion*: Besides *Hunger*, which is an *Emptinesse*: And yet *Ouer-Fasting* doth (many times) cause the *Appetite* to cease; For that *Want* of *Meat* maketh the *Stomach* draw *Humours*; And such *Humours* as are *Light*, and *Cholericke*, which quench *Appetite* most.

IT hath beene obserued by the *Ancients*, that where a *Rain-Bow*, seemeth to hang ouer, or to touch, there breatheth forth a *Sweet Smell*. The Cause is, for that this happeneth but in certaine Matters, which haue in themselves some *Sweetnesse*; Which the *Gentle Dew* of the *Rain-Bow* doth draw forth: And the like doe *Soft Showers*; For they also make the *Grounds* Sweet: But none are so delicate as the *Dew* of the *Rain-Bow*, where it falleth. It may be also, that the *water* it selfe hath some *Sweetnesse*: For the *Rain-Bow* consisteth of a *Glomeration* of *Small Drops*, which cannot possibly fall, but from the *Aire*, that is very *Low*: And there-

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Experiment
Solitary tou-
ching the Na-
ture of Appetite
in the Stomach.

831

Experiment
Solitary tou-
ching Sweet-
nesse of Odour
from the Raine-
bow.

832

therefore may hold the very *Sweetnesse* of the *Herbs*, and *Flowers*, as a *Distilled water*: For *Raine*, and other *Dew*, that fall from high, cannot preferue the *Smell*, being dissipated in the drawing vp: Neither doe we know, whether some *water* it selfe, may not haue some degree of *Sweetnesse*. It is true that we finde it sensibly in no *Poole*, *Riuer*, nor *Fountaine*; But good *Earth*, newly turned vp, hath a *Freshnesse*, and good *Sent*; Which *Water*, if it be not too *Equall*, (For *Equall Objects* neuer moue the *Sense*,) may also haue. Certaine it is, that *Bay Salt*, which is but a kinde of *water Congealed*, will sometimes smell like *Violets*.

Experiment
Solitary touch-
ing Sweet
Smells.

833

TO *Sweet Smells* *Heat* is requisite, to Concoct the *Matter*; And some *Moisture* to Spread the *Breath* of them. For *Heat*, we see that *woods*, and *Spices*, are more *Odorate* in the *Hot Countries*, than in the *Cold*: For *Moisture*, we see that things too much *Dried*, lose their *Sweetnesse*: And *Flowers* growing, smell better in a *Morning*, or *Evening*, than at *Noone*. Some *Sweet Smells* are destroyed by Approach to the *Fire*; As *Violets*, *Wall-Flowers*, *Gilly-Flowers*, *Pinckes*; And generally all *Flowers* that haue *Coole* and *Delicate Spirits*. Some continue both on the *Fire*, and from the *Fire*, As *Rose-Water*, &c. Some doe scarce come forth, or at least not so pleasantly, as by meanes of the *Fire*; as *Iuniper*, *Sweet Gums*, &c. And all *Smells*, that are Enclosed in a *Fast Body*: But (generally) those *Smells* are the most *Gratefull*, where the degree of *Heat* is *Small*; Or where the *Strength* of the *Smell* is allayed; For these *Things* doe rather woode the *Sense*, than Sariate it. And therefore the *Smell* of *Violets*, and *Roses*, exceedeth in *Sweetnesse* that of *Spices*, and *Gummes*; And the Strongest Sort of *Smells*, are best in a west, a farre off.

Experiment
Solitary touch-
ing the Cor-
poreall Substance
of Smells.

834

IT is certaine, that no *Smell* issueth, but with *Emission* of some *Corporeall Substance*; Not as it is in *Light*, and *Colours*, and in *Sounds*. For we see plainly, that *Smell* doth spread nothing that distance, that the other doe. It is true, that some *woods* of *Orenges*, and *Heathes* of *Rose-Mary*, will Smell a great way into the *Sea*, perhaps twenty Miles; But what is that, since a *Peale* of *Ordinance* will doe as much, which moueth in a small compasse? Whereas those *woods*, and *Heathes*, are of *Vast Spaces*: Besides wee see that *Smells* doe adhere to *Hard Bodies*; As in *Perfuming* of *Gloves*, &c. which sheweth them *Corporeall*; And doe Last a great while, which *Sounds*, and *Light* doe not.

Experiment
Solitary touch-
ing Fetide
and Fragrant
Odours.

835

THe *Excrements* of most *Creatures* Smell ill; Chiefly to the same *Creature* that voideth them: For we see, besides that of *Man*, that *Pigeons* and *Horses* thrive best, if their *Houses* and *Stables* be kept Sweet; And so of *Cage-Birds*: And the *Cat* burieth that which shee voydeth: And it holdeth chiefly in those *Beasts*, which feed vpon *Flesh*. *Dogs* (almost) onely of *Beasts*, delight in *Fetide Odours*; Which sheweth there is somewhat in their *Sense* of *Smell*, differing from the *Smells* of other *Beasts*. But the *Cause*, why *Excrements* smell ill, is manifest; For that the

Body

Body it selfe reiected them; Much more the *Spirits*: And we see, that those *Excrements*, that are of the *First Digestion*, Smell the worst; As the *Excrements* from the *Belly*: Those that are from the *Second Digestion*, lesse ill; As *Urine*; And those that are from the *Third*, yet lesse. For *Sweat* is not so bad, as the other two; Especially of some *Persons*, that are full of *Heat*. Likewise most *Putrifications* are of an *Odious Smell*: For they smell either *Fetide*, or *Mouldy*. The *Cause* may be, for that *Putrification* doth bring forth such a *Consistence*, as is most Contrary to the *Consistence* of the *Body*, whilst it is Sound: For it is a meere dissolution of that *Forme*. Besides, there is another Reason which is Profound: And it is that the *Objects* that please any of the *Senses*, haue (all) some *Equality*, and (as it were) *Order*, in their *Composition*: But where those are wanting, the *Object* is euer Ingrate. So *Mixture* of many *Disagreeing Colours* is euer vnpleasant to the *Eye*: *Mixture* of *Discordant Sounds* is vnpleasant to the *Eare*: *Mixture*, or *Hotch-Potch* of many *Tastes*, is vnpleasant to the *Taste*: *Harshnesse* and *Ruggednesse* of *Bodies*, is vnpleasant to the *Touch*: Now it is certaine, that all *Putrification*, being a *Dissolution* of the first *Forme*, is a meere *Confusion*, and *Unformed Mixture* of the *Part*. Neuerthelesse it is strange, and seemeth to Crosse the former *Observation*, that some *Putrifications* and *Excrements* doe yeeld *Excellent Odours*; As *Cinnet* and *Muske*; And as some thinke *Amber-Greece*: For diuers take it, (though vnprobably) to come from the *Sperme* of *Fish*: And the *Mosse* we spake of from *Apple-Trees*, is little better than an *Excretion*. The Reason may be, for that there passeth in the *Excrements*, and remaineth in the *Putrifications*, some good *Spirits*; especially where they proceed from *Creatures*, that are very *Hot*. But it may be also ioyned with a further *Cause*, which is more Subtill; And it is, that the *Senses* loue not to bee Ouerpleased; But to haue a *Commixture* of somewhat that is in it selfe Ingrate. Certainly, we see how *Discords* in *Musicke*, falling vpon *Concords*, make the *Sweetest Straines*: And we see againe, what Strange *Tastes* delight the *Taste*; As *Red-Herrings*, *Cauary*, *Parmizan*, &c. And it may be, the same holdeth in *Smels*. For those kinde of *Smels*, that we haue mentioned, are all Strong, and doe Pull and Vellicate the *Sense*. And wee finde also, that *Places* where Men *Urine*, commonly haue some *Smell* of *Violets*: And *Urine*, if one hath eaten *Nutmeg*, hath so too.

The Sloathfull, Generall, and Indefinite *Contemplations*, and *Notions*, of the *Elements*, and their *Coniugations*; Of the *Influences* of *Heauen*; Of *Heat*, *Cold*, *Moisture*, *Drought*; *Qualities Actiue*, *Passiue*; And the like; haue swallowed vp the true *Passages*, and *Processes*, and *Affects*, and *Consistences* of *Matter*, and *Naturall Bodies*. Therefore they are to be set aside, being

T

but

but *Notionall*, and ill *Limited*; And *Definite Axiomes* are to be drawne out of *Measured Instances*: And so Assent to be made to the more *Generall Axiomes*, by *Scale*. And of these *Kindes of Processes of Natures* and *Characters of Matter*, we will now set downe some *Instances*.

Experiment
Solitary, touch-
ing the Cau-
ses of Putrifa-
ction.

836

ALL *Putrifaction* come chiefly from the *Inward Spirits* of the *Body*, And partly also from the *Ambient Body*, be it *Aire*, *Liquor*, or what-soeuer else. And this last, by two *Meanes*: Either by *Ingresse* of the *Substance* of the *Ambient Body*, into the *Body Putrified*; Or by *Excitation* and *Sollicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambients*. As for the Received Opinion, that *Putrifaction* is caused, either by *Cold*, or *Peregrine* and *Preternaturall Heat*, it is but *Nugation*: For *Cold in Things Inanimate*, is the greatest Enemy that is, to *Putrifaction*; though it extinguisheth *Vinification*, which euer consisteth in *Spirits Attenuate*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine Heat*, it is thus farre true; That if the *Proportion* of the *Aduentine Heat*, be greatly *Predominant*, to the *Naturall Heat*, and *Spirits* of the *Body*, it tendeth to *Dissolution*, or *Notable Alteration*. But this is wrought by *Emission*, or *Suppression*, or *Suffocation*, of the *Native Spirits*; And also by the *Disordination*, and *Discomposure* of the *Tangible Parts*; And other *Passages of Nature*; And not by a *Conflict* of *Heats*.

Experiment
Solitary touch-
ing Bodies
Vaperfectly
Mixt.

837

IN *Versions* or *Maine Alterations* of *Bodies*, there is a *Medium* betweene the *Body*, as it is at first, and the *Body Resulting*; which *Medium* is *Corpus imperfectè Mistum*, and is *Transitory*, and not *durable*; As *Mists*, *Smokes*, *Vapours*, *Chylus* in the *Stomach*, *Lining Creatures* in the first *Vinification*: And the *Middle Action*, which produceth such *Imperfect Bodies*, is fitly called (by some of the *Ancients*) *Inquination*, or *Inconcoction*, which is a *Kinde of Putrifaction*; For the *Parts* are in *Confusion*, till they settle one way, or other.

Experiment
Solitary touch-
ing Concocti-
on and Crudity.

838

THe word *Concoction*, or *Digestion*, is chiefly taken into vse from *Lining Creatures* and their *Organs*; And from thence extended to *Liquors*, and *Fruits*, &c. Therefore they speake of *Meat Concocted*, *Vrine* and *Excrements Concocted*; And the *Four Disgestions*, (In the *Stomach*; In the *Liner*; In the *Arteries* and *Nerves*; And in the *Seuerall Parts* of the *Body*;) are likewise called *Concoctions*: And they are all made to be the *Workes of Heat*: All which *Notions* are but ignorant *Catches* of a few *Things*, which are most *Obuius* to *Mens Observations*. The *Constantest Notion* of *Concoction* is, that it should signifie the *Degrees* of *Alteration*, of one *Body* into another, from *Crudity* to perfect *Concoction*; Which is the *Vltimity* of that *Action* or *Processe*: And while the *Body* to be *Conuerted* and *Altered*, is too strong for the *Efficient*, that should *Conuert*, or *Alter* it, (whereby it resisteth and holdeth fast in some degree the first

Forme,

Forme, or *Consistence*) it is (all that while) *Crude*, and *Inconcoct*; And the *Processe* is to be called *Crudity* and *Inconcoction*. It is true, that *Concoction* is, in great part, the *Worke* of *Heat*; But not the *Worke* of *Heat* alone: For all Things, that further the *Conuerſion*, or *Alteration*, (as *Reſt*, *Mixture* of a *Body* already *Concocted*, &c.) are alſo *Meanes* to *Concoction*. And there are of *Concoction* two *Periods*; The one *Aſſimilation*, or *Absolute Conuerſion*, and *Subaction*; The other *Maturation*: whereof the Former is moſt conſpicious in the *Bodies* of *Living Creatures*; In which there is an *Absolute Conuerſion*, and *Aſſimilation* of the *Nouriſhment* into the *Body*: And likewise in the *Bodies* of *Plants*: And againe in *Metalls*, where there is a full *Transmutation*. The other (which is *Maturation*) is ſeene in *Liquors*, and *Fruits*; wherein there is not deſired, nor pretended, an ytter *Conuerſion*, but only an *Alteration* to that *Forme*, which is moſt ſought, for *Mans* uſe; As in *Clarifying* of *Drinkes*; *Ripening* of *Fruits*, &c. But note, that there be two *Kind*s of *Absolute Conuerſions*; The one is, when a *Body* is conuerted into another *Body*, which was before; As when *Nouriſhment* is turned into *Fleſh*; That is it which we call *Aſſimilation*. The other is, when the *Conuerſion* is into a *Body* meerely New, and which was not before; As if *Siluer* ſhould be turned to *Gold*; or *Iron* to *Copper*: And this *Conuerſion* is better called, for diſtinction ſake, *Transmutation*.

There are alſo diuers other *Great Alterations* of *Matter*, and *Bodies*, beſides thoſe that tend to *Concoction*, and *Maturation*; For whatſoever doth ſo alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Maior*: As when *Meat* is Boiled, or Roaſted, or Fried, &c. Or when *Bread* and *Meat* are Baked; Or when *Cheeſe* is made of *Curds*, or *Butter* of *Creame*, or *Coales* of *Wood*, or *Bricks* of *Earth*; And a Number of others. But to apply *Notions* *Philosophicall* to *Plebeian* *Termes*; Or to ſay, where the *Notions* cannot fitly be reconciled, that there wanteth a *Terme*, or *Nomenclature* for it; (as the *Ancients* uſed;) They be but *Shifts* of *Ignorance*; For *Knowledge* will be euer a *wandering* and *Indigeſted Thing*, if it be but a *Commixture* of a few *Notions*, that are at hand and occurre, and not excited from ſufficient Number of *Inſtances*, and thoſe well collated.

The *Conſiſtences* of *Bodies* are very diuers: *Denſe*, *Rare*; *Tangible*, *Pneumaticall*; *Volatile*, *Fixed*; *Determinate*, *Not Determinate*; *Hard*, *Soft*; *Cleaving*, *Not Cleaving*; *Congealeable*, *Not Congealeable*; *Liqueſiable*, *Not Liqueſiable*; *Fragile*, *Tough*; *Flexible*, *Inflexible*; *Tractile*, or to be drawne forth in length, *Intractile*; *Porous*, *Solid*; *Equall*, and *Smooth*, *Vnequall*; *Venous*, and *Fibrous*,

brow, and with Graines, Entire; And diuers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, and *Drought*, is a *Compendious* and *Inutile Speculation*. But of these see principally our *Abecedarium Naturæ*; And otherwise *Sparsum* in this our *Sylua Sylvarum*: Neuerthelesse in some good part, Wee shall handle diuers of them now presently.

Experiment
Solitary touch-
ing Bodies Li-
quefiable, and
not Liquefiable.

840

Liquefiable, and Not Liquefiable, proceed from these Causes: *Liquefaction* is euer caused by the *Detention* of the *Spirits*, which play within the *Body*, and Open it. Therefore such *Bodies* as are more *Turgid* of *Spirit*; Or that haue their *Spirits* more *Straitly Imprisoned*; Or againe that hold them *Better Pleased*, and *Content*; are *Liquefiable*: For these three *Dispositions* of *Bodies*, doe arrest the *Emission* of the *Spirits*. An Example of the first two *Properties* is in *Metals*; And of the Last in *Grease*, *Pitch*, *Sulphure*, *Butter*, *wax*, &c. The *Disposition* not to *Liquefie* proceedeth from the *Easie Emission* of the *Spirits*, whereby the *Grosser Parts* contract; And therefore, *Bodies Ieiune* of *Spirits*; Or which part with their *Spirits* more *willingly*; are not *Liquefiable*; As *wood*, *Clay*, *Free-Stone*, &c. But yet, euen many of those *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithstanding *soften*; As *Iron* in the *Forge*; And a *sticke* bathed in *Hot Ashes*, which thereby becommeth more *Flexible*. Moreouer, there are some *Bodies*, which doe *Liquefie*, or dissolue by *Fire*; As *Metals*, *wax*, &c. And other *Bodies*, which dissolue in *water*; As *Salt*, *Sugar*, &c. The Cause of the former proceedeth from the *Dilatation* of the *Spirits* by *Heat*: The Cause of the Latter proceedeth from the *Opening* of the *Tangible Parts*, which desire to receiue the *Liquour*. Again, there are some *Bodies*, that dissolue with both; As *Gumme*, &c. And those be such *Bodies*, as on the One Side haue good store of *Spirit*; And on the other Side, haue the *Tangible Parts* *Indigent* of *Moisture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the Latter stimulateth the *Parts* to Receiue the *Liquour*.

Experiment
Solitary touch-
ing Bodies
Fragile, and
Tough.

841

OF *Bodies*, some are *Fragile*; And some are *Tough*, and Not *Fragile*; And in the *Breaking*, some *Fragile Bodies* breake but where the *Force* is; Some shatter and fly in many *Peeces*. Of *Fragility* the Cause is an *Impotency* to be *Extended*: And therefore *Stone* is more *Fragile* than *Metall*; And so *Fistile Earth* is more *Fragile* than *Crude Earth*; And *Dry wood* than *Greene*. And the Cause of this *Vnaptnesse* to *Extension*, is the *Small Quantity* of *Spirits*; (For it is the *Spirit* that furthereth the *Extension* or *Dilatation* of *Bodies*;) And it is euer *Concomitant* with *Porosity*, and with *Driness* in the *Tangible Parts*: *Contrariwise*, *Tough Bodies* haue more *Spirit*, and fewer *Pores*, and *Moister Tangible Parts*: Therefore wee see that *Parchment*, or *Leather* will stretch, *Paper* will not; *woollen Cloth* will tenter, *Linnen* scarcely.

Alj

ALL *Solid Bodies* consist of *Parts* of two severall *Natures*; *Pneumatick*, and *Tangible*; And it is well to be noted, that the *Pneumatick Substance* is in some *Bodies*, the *Native Spirit* of the *Body*; And in some other, plaine *Aire* that is gotten in; As in *Bodies Desiccate*, by *Heat*, or *Age*: For in them, when the *Native Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Pores*. And those *Bodies* are ever the more *Fragile*; For the *Native Spirit* is more *Yielding*, and *Extensile*, (especially to follow the *Parts*,) than *Aire*. The *Native Spirits* also admit great *Diversity*; As *Hot*, *Cold*, *Active*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as wee call them) of *Bodies*: But the *Aire Intermixt*, is without *Vertues*, and maketh Things *Inspide*, and without any *Exstimulation*.

Experiment
Solitary tou-
ching the Two
Kinds of *Pneu-
matics* in *Bo-
dies*.

842

THE *Concretion* of *Bodies* is (commonly) solved by the *Contrary*; As *Ice*, which is congealed by *Cold*, is dissolved by *Heat*, *Salt*, and *Sugar*, which are Excocted by *Heat*, are Dissolved by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations*, are rather *Returns* to their former *Nature*, than *Alterations*: So that the *Contrary* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by *Contrary Efficients*, seemeth to be the Same; And that is, because the *Spirit* of the *Oyle*, by either *Meanes*, exaleth little; For the *Cold* keepeth it in; and the *Heat*, (except it be *Vehement*,) doth not call it forth: As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them *Swell*, than *Congeale* them: As when *Ice* is congealed in a *Cup*, the *Ice* will *Swell* in stead of *Contracting*; And sometimes *Rift*.

Experiment
Solitary tou-
ching *Concreti-
on*, and *Dissola-
tion* of *Bodies*.

843

OF *Bodies*, some (we see) are *Hard*, and some *Soft*: The *Hardnesse* is caused (chiefly) by the *Leinnesse* of the *Spirits*; And their *Imparity* with the *Tangible Parts*: Both which, if they be in a greater degree, maketh them not only *Hard*, but *Fragile*, and lesse *Enduring* of *Pressure*; As *Steele*, *Stone*, *Glasse*, *Dry Wood*, &c. *Softnesse* commeth (contrariwise) by the Greater *Quantity* of *Spirits*; (which ever helpeth to *Induce Yielding* and *Cession*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *wax*, &c. But note that *Soft Bodies*, (as wee vse the word,) are of two *Kinds*; The one, that easily giueth place to another *Body*, but altereth not *Bulke*, by *Rising* in other *Places*; And therefore we see that *wax*, if you put any Thing into it, doth not rise in *Bulke*, but only giueth *Place*: For you may not thinke, that in *Printing* of *wax*, the *wax* riseth vp at all; But only the *depressed Part* giueth place, and the other remaineth as it was: The other, that altereth *Bulke* in the *Cession*; As *water*, or other *Liquours*, if you put a *Stone*, or any Thing into them, they giue place (indeed) easily, but then they rise all over: Which is a *False Cession*; For it is in *Place* and not in *Body*.

Experiment
Solitary tou-
ching *Hard
and Soft Bodies*.

844

Experiment
Solitary tou-
ching Bodies
Ductile, and
Tensile.

845

ALL Bodies Ductile, and Tensile, (as Metals that will be drawne into Wires; wooll and Tow that will be drawne into Yarne, or Thred) haue in them the Appetite of Not Discontinuing, Strong; Which maketh them follow the Force, that pulleth them out; And yet so, as not to Discontinue or forsake their owne Body. Viscous Bodies, (likewise) as Pitch, wax, Bird-Lime, Cheese roasted, will draw forth, and rope. But the difference betweene Bodies Fibrous, and Bodies Viscous, is Plaine; For all wooll, and Tow, and Cotton, and Silke, (especially raw Silke) haue, besides their Desire of Continuance, in regard of the Tenuity of their Thred, a Greedinesse of Moisture; And by Moisture to ioyne and incorporate with other Thred; Especially if there be a little Wreathing; As appeareth by the Twisting of Thred; And the Practice of Twirling about of Spindles. And we see also, that Gold and Silver Thred cannot bee made without Twisting.

Experiment
Solitary tou-
ching other
Passions of Mat-
ter, and Chara-
cters of Bodies.

846

THe Differences of Impresible and Not Impresible; Figurable and Not Figurable; Mouldable and Not Mouldable; Scissile and Not Scissile; And many other Passions of Matter, are Plebeian Notions, applied vnto the Instruments and Uses which Men ordinarily practise; But they are all but the Effects of some of these Causes following; Which we will Enumerate without Applying them, because that would bee too long. The First is the Cession, or not Cession of Bodies, into a Smaller Space or Roome, keeping the Outward Bulke, and not flying vp. The Second is the Stronger or weaker Appetite, in Bodies, to Continuity, and to flie Discontinuity. The Third is the Disposition of Bodies, to Contract, or Not Contract; And againe, to Extend, or Not Extend. The Fourth is the Small Quantity, or Great Quantity, of the Pneumaticall in Bodies. The Fifth is the Nature of the Pneumaticall, whether it bee Native Spirit of the Body, or Common Aire. The Sixth is, the Nature of the Native Spirits in the Body, whether they be Active and Eager, or Dull and Gentle. The Seuen is the Emission or Detention of the Spirits in Bodies. the Eighth is the Dilatation, or Contraction of the Spirits in Bodies, while they are detained. The Ninth is the Collocation of the spirits in Bodies, whether the Collocation be Equall, or Vnequall; And againe, whether the Spirits be Coconcentrate, or Diffused. The Tenth is the Densitie, or Raritie of the Tangible Parts. The Eleuenth is the Equality or Inequality of the Tangible Parts. The Twelfth is the Digestion, or Crudity of the Tangible Parts. The Thirteenth is the Nature of the Matter, whether Sulphureous or Mercuriall, watric or Oylie, Drie and Terrestriall, or Moist and Liquid; which Natures of Sulphureous and Mercuriall, seeme to bee Natures Radicall, and Principall. The Fourteenth is the Placing, of the Tangible Parts, in Length, or Transverse; (as it is in the warpe, and the woofe of Textiles;) More Inward, or More Outward; &c. The Fifteenth is the Porosity, or Imporosity betwixt the Tangible Parts; And the Greatnesse, or Smallnesse of the Pores. The Sixteenth is the Collocation and Posture of the Pores. There may be more Causes; but these doe occurre for the Present.

Take

TAke *Lead*, and melt it, and in the middest of it, when it beginneth to congeale, make a little Dint, or Hole, and put *Quicke-siluer* wrapped in a Peece of *Linnen* into that Hole, and the *Quick-siluer* will fix, and runne no more, and endure the Hammer. This is a Noble Instance of *Induration*, by Consent of one *Body* with another, and Motion of Excitation to Imitate; For to ascribe it only to the Vapour of *Lead*, is lesse Probable. Quære whether the Fixing may be in such a degree, as it will be Figured like other *Metalls*? For if so, you may make Workes of it for some purposes, so they come not neare the Fire.

Experiment
Solitary tou-
ching Indurati-
on by Sympathy.

847

Sugar hath put downe the vse of *Honey*; In so much as wee haue lost those Observations, and Preparations of *Honey*, which the *Ancients* had, when it was more in Price. First, it seemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the Teare or Bloud issuing from the Tree: In so much as one of the *Ancients* relateth, that in *Trebi-sond*, there was *Honey* issuing from the *Box-Trees*, which made Men Mad. Againe, in Ancient time, there was a Kind of *Honey*, which either of the owne Nature, or by Art, would grow as Hard as *Sugar*, And was not so Lushious as Ours. They had also a *Wine of Honey*, which they made thus. They crushed the *Honey* into a great Quantitie of *Water*, and then strained the *Liquor*; After they boyled it in a Copper to the halfe: Then they powred it into *Earthen Vessels*, for a small time; And after tunned it into *Vessels of wood*; and kept it for many yeares. They haue also, at this day, in *Russia*, and those *Notherne Countries*, *Mead Simple*, which (well made, and seasoned) is a good wholesome *Drinke*, and very Cleare. They vse also in *wales*, a Compound *Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that wee haue lost in *Honey*, there were brought in vse a *Sugar-Mead*, (for so we may call it,) though without any Mixture at all of *Honey*. And to brew it, and keepe it stale, as they vse *Mead*; For certainly, though it would not be so *Abstersiue*, and *Opening*, and *Solutiue* a *Drinke*, as *Mead*, yet it will be more gratefull to the *Stomach*, and more *Lenitiue*, and fit to be vsed in *Sharpe Diseases*: For we see, that the vse of *Sugar* in *Beere*, and *Ale*, hath good Effects in such Cases.

Experiment
Solitary tou-
ching Honey
and Sugar.

848

IT is reported by the *Ancients*, that there was a Kind of *Steele*, in some places, which would polish almost as white and bright as *Siluer*. And that there was in *India* a Kind of *Brasse*, which (being polished) could scarce be discerned from *Gold*. This was in the *Naturall Vre*; But I am doubtfull, whether Men haue sufficiently refined *Metalls*, which wee count *Base*; As whether *Iron*, *Brasse*, and *Tin*, be refined to the Height? But when they come to such a Finenesse, as serueth the ordinary vse; they trie no further.

Experiment
Solitary tou-
ching the Finer
Sort of Base
Metalls.

849

THere haue beene found certaine *Cements* vnder *Earth*, that are very Soft; And yet, taken forth into the *Sun*, harden as Hard as *Marble*:

Experiment
Solitary tou-
ching Cements
and Quarries.

There

850

There are also ordinary *Quarries* in *Somersetshire*, which in the *Quarry* cut soft to any *Bignesse*, and in the *Building* proue firme, and hard.

Experiment
Solitary touching the
Altering of the Colour
of Haires
and Feathers.

851

Living *Creatures* (generally) doe change their *Haire* with *Age*, turning to be *Gray* and *White*: As is seene in *Men*, though some Earlier, some Later,; In *Horses*, that are Dappled, and turne *white*; In *Old Squirrels*, that turne *Grisly*; And many others. So doe some *Birds*; As *Cygnets*, from *Gray* turne *white*; *Hawkes*, from *Browne* turne more *white*: And some *Birds* there be, that vpon their *Moulting*, doe turne *Colour*; As *Robin Red-breasts*, after their *Moulting*, grow to be *Red* againe, by degrees; So doe *Gold-Finches* vpon the *Head*. The cause is, for that *Moisture* doth (chiefly) colour *Haire*, and *Feathers*; And *Drienesse* turneth them *Gray* and *White*; Now *Haire* in *Age* waxeth *Drier*: So doe *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and so all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Haire* of the *Head*, and doth (for the most part,) wax *Hoare* later. Out of this Ground, a *Man* may deuise the *Meanes* of *Altering* the *Colour* of *Birds*; and the *Retardation* of *Hoare-Haires*. But of this see in the fifth *Experiment*.

Experiment
Solitary touching the
Differences of Living
Creatures,
Male and Female.

852

The *Difference* between *Male* and *Female*, in some *Creatures*, is not to be discerned, otherwise than in the *Parts* of *Generation*: As in *Horses* and *Mares*, *Dogges* and *Bitches*, *Doues* *He* and *She*, and others. But some differ in *Magnitude*, and that diuersly; For in most the *Male* is the greater; As in *Man*, *Pheasants*, *Peacocks*, *Turkey's*, and the like; And in some few, as in *Hawkes*, the *Female*. Some differ in the *Haire*; and *Feathers*, both in the *Quantity*, *Crispation*, and *Colours* of them; As *He-Lions* are *Hersure*, and haue great *Maines*; The *She's* are smooth like *Cats*. *Bulls* are more *Crispe* vpon the *Fore-head* than *Cowes*; The *Peacocks*, and *Pheasant-Cocks*, and *Gold-finch-Cocks*, haue glorious and fine *Colours*; The *Henn's* haue not. Generally, the *Hees* in *Birds* haue the fairest *Feathers*. Some differ in diuers *Features*; As *Buckes* haue *Hornes*, *Doe's* none; *Rammes* haue more wreathed *Hornes* than *Ewes*; *Cocks* haue great *Combes* and *Spurres*; *Hens* little or none; *Boares* haue great *Fangs*, *Sowes* much lesse; The *Turkey-Cocks* hath great and *Swelling Gills*, the *Hen* hath lesse; *Men* haue generally *Deeper* and *Stronger Voices*, than *women*. Some differ in *Facultie*; As the *Cocks* amongst *Singing Birds*, are the best *Singers*. The *Chiefe Cause* of all these, (no doubt,) is, for that the *Males* haue more *Strength* of *Heat* than the *Females*; Which appeareth manifestly in this, that all young *Creatures* *Males*, are like *Females*; And so are *Eunuchs*, and *Gelt Creatures* of all kindes, liker *Females*. Now *Heat* causeth *Greatnesse* of *Growth*, generally, where there is *Moisture* enough to worke vpon: But if there be found in any *Creature*, (which is seene rarely,) an *Ouer-great Heat* in proportion to the *Moisture*, in them the *Female* is the greater; As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the *Moisture*, then there is no difference to be seene betweene *Male* and *Female*.

male: As in the *Instances* of *Horses*, and *Dogges*. We see also, that the *Hornes*: of *Oxen*, and *Cowes*, for the most part, are Larger than the *Bulls*; which is caused by abundance of *Moisture*, which in the *Hornes* of the *Bull* faileth. Again, *Heat* causeth *Pilosity*, and *Crispation*; And so likewise *Beards* in *Men*. It also expelleth finer *Moisture*, which Want of *Heat* cannot Expell: And that is the Cause of the *Beauty* and *Variety* of *Fethers*: Again, *Heat* doth put forth many *Excrecences*, and much *Solide Matter*, which Want of *Heat* cannot do: And this is the Cause of *Hornes*, and of the *Greatnesse* of them; And of the *Greatnesse* of the *Combes* and *Spurres* of *Cockes*, *Gills* of *Turky-Cockes*, and *Fangs* of *Boares*. *Heat* also dilateth the *Pipes*, and *Organs*, which causeth the *Deepenesse* of the *Voice*. Again, *Heat* refineth the *Spirits*, and that causeth the *Cock-Singing Bird*, to Excell the *Hen*.

There be *Fishes* greater than any *Beasts*, As the *Whale* is farre greater than the *Elephant*. And *Beasts* are (generally) greater than *Birds*, For *Fishes*, the cause may be, that because they Live not in the *Aire*, they have not their *Moisture* drawn and Soaked by the *Aire*, and *Sun-Beames*. Also they rest alwayes, in a manner; and are supported by the *water*; whereas *Motion* and *Labour* doe consume. As for the *Greatnesse* of *Beasts*, more than of *Birds*, it is caused; for that *Beasts*, stay Longer time in the *Wombe*, than *Birds*; and there Nourish, and Grow; Whereas in *Birds*, after the *Egge* Lay'd, there is no further *Growth*, or *Nourishment* from the *Female*: For the *Siring* doth *Vivifie*, and not Nourish.

We haue partly touched before the *Meanes* of *Producing Fruits*, without *Coares*, or *Stones*. And this wee adde further, that the Cause must be *Abundance* of *Moisture*, For that the *Coare*, and *Stone* are made of a *Drie Sap*: And wee see that it is possible to make a *Tree* put forth only in *Blossome*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more into *Fruit* without *Stone*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted vpon a *Colewort-Stalk*, sendeth forth a great *Apple* without a *Coare*. It is not vnlikely, that if the *Inward Pith* of a *Tree*, were taken out, so that the *Iuyce* came only by the *Barke*, it would work the *Effect*. For it hath beene obserued, that in *Pollards*, if the *water* get in on the *Top*, and they become *Hollow*, they put forth the more. We adde also, that it is deliuered for certaine by some, that if the *Cions* be grafted, the *Small End* downwards, it will make *Fruit* haue little or no *Coares*, and *Stones*.

Tobacco is a thing of great *Price*, if it be in request. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards *Charge*. The *Charge* of making the *Ground*, and otherwise, is great, but nothing to the *Profit*. But the *English Tobacco*, hath small credit, as being too *Dull*, and *Earthy*: Nay the *Virginian Tobacco*, though that be in a *Hotter Climate*, can get no credit, for the same Cause: So that a *Triall*

Experiment
Solitary tou-
ching the Com-
paratiue Magni-
tude of Liuing
Creatures.

853

Experiment
Solitary tou-
ching Exossati-
on of Fruits.

854

Experiment
Solitary tou-
ching the Me-
lioration of To-
bacco.

855

a Triall to make Tobacco more *Aromaticall*, and better Concocted here in *England*, were a Thing of great profit. Some have gone about to doe it by Drenching the *English Tobacco*, in a Decoction or Infusion of *Indian Tobacco*: But those are but Sophistications, and Toyes; for Nothing that is once Perfect, and hath run his Race, can receiue much Amendment. You must euer resort to the Beginning of Things for *Melioration*. The Way of *Maturation* of Tobacco must, as in other *Plants*, be, from the *Heat*. Either of the *Earth*, or of the *Sunne*: We see some Leading of this in Musk-Melons; which are sowne vpon a *Hot Bed*, Dunged below, vpon a Bancke turned vpon the *South Sunne*, to giue *Heat* by *Reflexion*; Laid vpon *Tiles*, which increaseth the *Heat*; And couered with *Straw* to keepe them from *Cold*. They remoue them also, which addeth some *Life*: And by these Helps they become as good in *England*, as in *Italy*, or *Prouence*. These and the like Meanes, may be tried in Tobacco. Enquire also of the *Steeping* of the *Roots*, in some such *Liquor*, as may giue them *Vigour* to put forth *Strong*.

Experiment
Solitary touching
seuerall
Heats, working
the same Effects.

856

Heat of the *Sun*, for the *Maturation* of *Fruits*; Yea and the *Heat* of *Vivification* of *Living Creatures*, are both represented and supplied, by the *Heat* of *Fire*; And likewise, the *Heats* of the *Sunne*, and *Life*, are represented one by the other. *Trees*, set vpon the *Backs* of *Chimneyes*, doe ripen *Fruit* sooner. *Vines*, that haue beene drawne in at the *Window* of a *Kitchen*, haue sent forth *Grapes* ripe a *Month* (at least) before others. *Stones*, at the *Backe* of *Walls*, bring forth *Oranges* here with vs. *Eggs*, as is reported by some, haue beene hatched in the warmth of an *Ouen*. It is reported by the *Ancients*, that the *Estrich* Layeth her *Egs* vnder *Sand*, where the *Heat* of the *Sunne* discloseth them.

Experiment
Solitary touching
Swelling
and Dilatation
in Boiling.

857

Barley in the *Boiling* swelleth not much; *wheat* swelleth more; *Rize* extremely; In so much as a *Quarter* of a *Pint* (vnboyled) will arise to a *Pint* boiled. The *Cause* (no doubt) is, for that the more *Close* and *Compact* the *Body* is, the more it will dilate: Now *Barley* is the most *Hollow*; *wheat* more *Solide* than that; and *Rize* most *Solide* of all. It may be also that some *Bodies* haue a *Kinde* of *Lentour*, and more *Deperible Nature* than others; As we see it euident in *Colouration*; For a *Small Quantity* of *Saffron*, will *Tint* more, than a very great *Quantity* of *Bre-sill*, or *wine*.

Experiment
Solitary touching
the Dilatation of
Fruits.

858

Fruit groweth *Sweet* by *Rowling*, or *Pressing* them gently with the *Hand*; As *Rowling-Peares*, *Damasins*, &c. By *Rottenesse*; As *Medlars*, *Seruices*, *Sloe's*, *Heps*, &c. By *Time*; As *Apples*, *Wardens*, *Pomgranats*, &c. By certaine *Speciall Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*; As in *Roasting*, *Stewing*, *Baking*, &c. The *Cause* of the *Sweetnesse* by *Rowling*, and *Pressing*, is *Emollition*, which they properly enduce; As in *Beating* of *Stock-Fish*, *Flesh*, &c. By *Rottenesse* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*, and thereby digest the

the Harder Part; For in all *Putrifications*, there is a *Degree of Heat*. By *Time* and *Keeping* is, because the *Spirits* of the *Body*, doe euer feed vpon the *Tangible Parts*, and attenuate them. By seuerall *Maturations* is, by some *Degree of Heat*. And by *Fire* is, because it is the proper Work of *Heat* to Refine, and to Incorporate; And all *Sourenesse* consisteth in some *Grossnesse* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which euer induceth a *Milder Taste*.

OF *Fleshes*, some are *Edible*; Some, except it be in *Famine*, not. For those that are not *Edible*, the *Cause* is, for that they haue (commonly) too much *Bitternesse* of *Taste*; And therefore those *Creatures*, which are Fierce and *Cholericke*, are not *Edible*; As *Lions*, *wolues*, *Squirrells*, *Dogs*, *Foxes*, *Horses*, &c. As for *Kine*, *sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We see they are *Milde*, and *Fearefull*. Yet it is true, that *Horses*, which are *Beasts* of *Courage*, haue beene, and are eaten by some *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chineses* eat *Horse-flesh* at this day; And some *Gluttons* haue vsed to haue *Colts-flesh* baked. In *Birds*, such as are *Carniuora*, and *Birds of Prey*, are commonly no *Good Meat*; But the Reason is, rather the *Cholericke Nature* of those *Birds*, than their *Feeding* vpon *Flesh*; For *Puits*, *Gulls*, *Shouelers*, *Ducks*, doe feed vpon *Flesh*, and yet are *Good Meat*: And we see, that those *Birds*, which are of *Prey*, or feed vpon *Flesh*, are *good Meat*, when they are very *Young*; As *Hawkes*, *Rookes* out of the *Nest*, *Owles*, &c. *Mans Flesh* is not Eaten. The Reasons are Three: First, because *Men* in *Humani-ty* doe abhorre it: Secondly, because no *Living Creature*, that *Dyeth* of *it selfe*, is good to Eat: And therefore the *Caniballs* (themselues) eat no *Mans-flesh*, of those that *Dye* of *Themselues*, but of such as are *Slaine*. The Third is, because there must be (generally) some *Disparity*, between the *Nourishment*, and the *Body Nourished*; And they must not be *Over-neere*, or like: Yet we see, that in great *weakenesses*, and *Consumptions*, *Men* haue beene sustained with *womans Milke*: And *Ficinus* fondly (as I conceiue) aduise, for the *Prolongation* of *Life*, that a *Veine* be opened in the *Arme* of some wholesome *Young Man*; And the *Bloud* to be sucked. It is said, that *witches* doe greedily eat *Mans-flesh*, which If it be true, besides a *Diuellish Appetite* in them, it is likely to proceed, for that *Mans-flesh* may send vp high and *Pleasing Vapours*, which may stirre the *Imagination*; And *witches* *Felicity* is chiefly in *Imagination*, as hath beene said.

THere is an Ancient Received Tradition of the *Salamander*, that it liueth in the *Fire*, and hath force also to extinguish the *Fire*. It must haue two Things, if it be true, to this Operation: The One a very *Close Skin*, whereby *Flame* which in the *Midst* is not so hot, cannot enter: For wee see that if the *Palme* of the *Hand* be anointed thicke with *white* of *Egge*, and then *Aquavite* be powred vpon it, and Enflamed, yet one may endure the *Flame* a pretty while. The other is some *Extreme Cold* and

Quenching

Experiment
Solitary tou-
ching *Flesh* E-
dible, and not
Edible.

859

Experiment
Solitary tou-
ching the *Sala-
mander*.

860

Quenching vertue, in the Body of that Creature, which choaketh the Fire. Wee see that Milke quencheth wild-fire, better than water, because it entreth better.

Experiment
Solitary tou-
ching the Con-
trary Operations
of Time, vpon
Fruits and Li-
quors.

861

Time doth change *Fruit*, (as *Apples, Peares, Pomgranates, &c.*) from more *Sowre*, to more *Sweet*: But contrariwise *Liquors* (euen those that are of the *Iuyce of Fruit*) from more *Sweet* to more *Sowre*; As *wort, Must, New Veriuyce, &c.* The Cause is, the *Congregation of the Spirits* together: For in both *Kindes*, the *Spirits* is attenuated by *Time*; But in the first *Kinde*, it is more *Diffused*, and more *Mastered* by the *Grosser Parts*, which the *Spirits* doe but digest: But in *Drinks* the *Spirits* doe reigne, and finding lesse *Opposition of the Parts*, become themselues more *Strong*, Which causeth also more *Strength* in the *Liquor*; Such, as if the *Spirits* be of the *Hotter Sort*, the *Liquor* becommeth apt to *Burne*; But in *Time*, it causeth likewise, when the *Higher Spirits* are *Euaporated*, more *Sowrenesse*.

Experiment
Solitary tou-
ching Blowes
and Bruises.

862

IT hath beene obserued by the *Ancients*, that *Plates of Metall*, and especially of *Brasse*, applyed presently to a *Blow*, will keepe it downe from *Swelling*. The Cause is *Repercussion*, without *Humectation*, or *Entrance of any Body*: for the *Plate* hath only a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters*, and *Ointments* do enter. Surely, the Cause, that *Blowes* and *Bruises* enduce *Swellings*, is, for that the *Spirit* resorting to Succour the *Part* that *Laboureth*, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne of the Humour* in the *Part Strucken*, that causeth it; For That *Gouts*, and *Tooth-Aches* cause swelling, where there is no *Percussion* at all.

Experiment
Solitary tou-
ching the Orris
Root.

863

The Nature of the *Orris Root*, is almost Singular; For there be few *Odoriferous Roots*; And in those that are, in any degree, *Sweet*, it is but the same *Sweetnesse* with the *Wood*, or *Leafe*: But the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to haue a *Tender dainty Heat*; Which when it cometh aboue *Ground*, to the *Sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a *Smell* like a *Violet*.

Experiment
Solitary tou-
ching the Com-
pression of Li-
quors.

864

IT hath beene obserued by the *Ancients*, that a great *vessel* full, drawne into *Bottles*; And then the *Liquor* put againe into the *Vessell*, will not fill the *Vessell* againe, so full as it was, but that it may take in more *Liquor*: And that this holdeth more in *Wine*, than in *water*. The Cause may be *Triuiall*; Namely, by the *Expense of the Liquor*, in regard some may sticke to the *Sides of the Bottles*: But there may be a Cause more *Subtill*; Which is, that the *Liquor* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessell*, the *Liquor* meeteth with *Liquor* chiefly; But in the *Bottles* a *Small Quantity of Liquor*, mee-

teth

teth with the Sides of the *Bottles*, which Compresse it so, that it doth not Open it againe.

Water, being contiguous with *Aire*, Cooleth it, but Moistneth it not, except it *Vapour*. The *Cause* is, for that *Heat*, and *Cold* haue a *Virtuall Transition*, without *Communication* of *Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of such seuerall *Leuity*, and *Gravuty*, as they Mingle not, there can follow no *Imbibition*. And therefore, *Oyle* likewise lyeth at the *Top* of the *Water*, without *Commixture*: And a *Drop* of *Water*, running swiftly ouer a *Straw*, or *Smooth Body*, wetteth not.

Experiment
Solitary, touch-
ing the *Work-
ing* of *Water*
vpon *Aire* Con-
tiguous.

865

Star-Light *Nights*, yea, and bright *Moone-shine Nights*, are *Colder* than *Cloudy Nights*. The *Cause* is, the *Driness* and *Fineness* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharpe*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moone*, though it selfe inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is dry. Also *Close Aire*, is warmer than *Open Aire*; which (it may be) is, for that the true *Cause* of *Cold*, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is stronger; And againe, *Aire* it selfe, if it bee not altered by that *Expiration*, is not without some *Secret Degree* of *Heat*: As it is not likewise without some *Secret Degree* of *Light*: For otherwise *Cats*, and *Owles*, could not see in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Visuall Spirits* of those *Creatures*.

Experiment
Solitary touch-
ing the *Na-
ture* of *Aire*.

866

The *Eyes* doe moue one and the same way; For when one *Eye* moueth to the *Nostrill*, the other moueth from the *Nostrill*. The *Cause* is *Motion* of *Consent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Vse* will induce the Contrary: For some can *Squint*, when they will: And the Common *Tradition* is, that if *Children* be set vpon a *Table*, with a *Candle* behind them, both *Eyes* will moue Outwards; As affecting to see the light, and so induce *Squinting*.

Experiments
in Consort
touching the
Eyes, and *Sight*.

867

Wee see more exquisitely with one *Eye Shut*, than with *Both Open*. The *Cause* is, for that the *Spirits Visuall* vnite themselues more, and so become Stronger. For you may see by looking in a *Glasse*, that when you shut one *Eye*, the *Pupill* of the other *Eye*, that is Open, Dilateth.

868

The *Eyes*, if the *Sight* meet not in one *Angle*, See *Things Double*. The *Cause* is, for that *Seeing Two Things*, and *Seeing one Thing twice*, worketh the same *Effect*: And therefore a little *Pelles*, held betweene two *Fingers* laid a-crosse, seemeth *Double*.

869

Pore-blinde Men, see best in the *Dimmer Lights*; And likewise haue their *Sight* Stronger neere hand, than those that are not *Pore-blinde*; And can Reade and Write smaller *Letters*. The *Cause* is, for that the *Spirits Visuall*, in those that are *Pore-blinde*, are Thinner and Rarer, than in others; And therefore the Greater *Light* disperseth them. For the same

870

Cause they need Contracting; But being *Contracted*, are more strong, than the *Visuall Spirits* of Ordinary *Eyes* are; As when we see thorow a *Lenell*, the *Sight* is the Stronger: And so is it, when you gather the *Eye-lids* somewhat close: And it is commonly seene in those that are *Pore-blinde*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would see to Reade, put the Paper somewhat asfarre off. The Cause is, for that *Old Mens Spirits Visuall*, contrary to those of *Pore-blinde Men*, vnite not, but when the *Object* is at some good distance, from their *Eyes*.

871

Men see better, when their *Eyes* are ouer-against the *Sunne*, or a *Candle*, if they put their *Hand* a little before their *Eye*. The Reason is, for that the *Glaring* of the *Sunne*, or the *Candle* doth weaken the *Eye*; whereas the *Light Circumsufused* is enough for the *Perception*. For we see, that an *Ouer-light* maketh the *Eyes* Dazell; Infomuch as Perpetuall Looking against the *Sunne*, would Cause *Blindnesse*. Againe, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwise, if they come out of a *Darke Roome*, into a *Light Roome*, they seeme to haue a *Mist* before their *Eyes*, and see worse than they shall doe, after they haue stayed a little while, either in the *Light*, or in the *Darke*. The Cause is, for that the *Spirits Visuall*, are vpon a Sudden Change disturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much *Dilated* by *Light*, they cannot contract suddenly; And when they are much *Contracted* by *Darknesse*, they cannot *Dilate* suddenly. And Excesse of both these (that is, of the *Dilatation*, and *Contraction* of the *Spirits Visuall*;) if it be long, Destroyeth the *Eye*. For as long Looking against the *Sun*, or *Fire*, hurteth the *Eye*, by *Dilatation*; So *Curious Painting* in *Small Volumes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

872

It hath beene obserued, that in *Anger*, the *Eyes* wax *Red*; And in *Blushing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The Cause is, for that in *Anger*, the *Spirits* ascend and wax Eager; Which is most easily seene in the *Eyes*, because they are Translucide; Though withall it maketh both the *Cheekes*, and the *Gills* *Red*; But in *Blushing*, it is true, the *Spirits* ascend likewise to Succour, both the *Eyes* and the *Face*, which are the *Parts* that labour: But then they are repulsed by the *Eyes*, for that the *Eyes*, in Shame doe put backe the *Spirits* that ascend to them, as vnwilling to looke abroad: For no *Man*, in that *Passion*, doth looke strongly, but Deiectedly; And that *Repulsion* from the *Eyes*, Diuerteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

873

The *Objects* of the *Sight*, may cause a great *Pleasure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*; Except it be by *Memory*, as hath beene said. The *Glimses* and *Beames* of *Diamonds* that strike the *Eye*; *Indian Feathers*, that haue glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furnished; A *Beautifull* Person; And the like; doe delight and exhilarate the *Spirits* much. The

Reason,

Reason, why it holdeth not in the *Offence*, is, for that the *Sight* is the most *Spiritual* of the *Senses*; whereby it hath no *Obiect* *Grosse* enough to offend it. But the *Cause* (chiefly) is, for that there be no *Active* *Obiects* to offend the *Eye*. For *Harmonicall Sounds*, and *Discordant Sounds*, are both *Active*, and *Positive*: So are *Sweet Smells*, and *Stinkes*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Over-Hot*, and *Over-Cold*, in *Touch*: But *Blacknesse*, and *Darknesse*, are indeed but *Privatives*; And therefore haue little or no *Activity*. Somewhat they doe *Contristate*, but very little.

Water of the *Sea*, or otherwise, looketh *Black*er when it is moued, and *whiter* when it resteth. The *Cause* is, for that by meanes of the *Motion*, the *Beames* of light passe not *Straight*, and therefore must be darkned: whereas, when it resteth, the *Beames* doe passe *Straight*. Besides, *Splendour* hath a *Degree* of *whitenesse*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Steele* behinde, looketh *whiter* than *Glasse Simple*. This *Experiment* deserueth to be driuen further, in *Trying* by what meanes *Motion* may hinder *Sight*.

Shell-Fish haue beene, by some of the *Ancients*, compared and sorted with the *Insecta*; But I see no reason why they should; For they haue *Male*, and *Female*, as other *Fish* haue; Neither are they bred of *Putrifaction*; Especially such as doe Moue. Neuerthelesse, it is certaine, that *Oysters*, and *Cockles*, and *Mussels*, which Moue not, haue no discriminate *Sex*: *Quere* in what time, and how they are bred? It seemeth that *Shells* of *Oysters* are bred where none were before; And it is tried, that the great *Horse-Mussle*, with the fine shell, that breedeth in *Ponds*, hath bred within thirty yeares: But then, which is strange, it hath beene tried, that they doe not onely *Gape*, and *Shut*, as the *Oysters* doe, but *Remoue* from one *Place* to *Another*.

The *Senses* are alike *Strong*, both on the *Right Side*, and on the *Left*; But the *Limbes* on the *Right Side* are *Stronger*. The *Cause* may be, for that the *Braine*, which is the *Instrument* of *Sense*, is alike on both *Sides*; But *Motion*, and *Habillities* of *Mouing*, are somewhat holpen from the *Liner*, which lieth on the *Right Side*. It may be also, for that the *Senses* are put in *Exercise*, indifferently, on both *Sides*, from the time of our *Birth*; But the *Limbes* are vsed most on the *Right Side*, whereby *Custom* helpeth; For we see that some are *Left-Handed*: Which are such, as haue vsed the *Left-Hand* most.

Friccions make the *Parts* more *Fleshie* and *Full*: As wee see both in *Men*; And in *Currying* of *Horses*, &c. The *Cause* is, for that they draw greater *Quantity* of *Spirits* and *Bloud* to the *Parts*: And againe, because they draw the *Aliment* more forcibly from within: And againe, because they relax the *Pores*, and so make better *Passage* for the *Spirits*, *Bloud*, and *Aliment*: Lastly, because they dissipate and digest any *Inutile* or *Excrementitious*

Experiment
Solitary touching the Colour of the Sea, or other Water.

874

Experiment
Solitary touching Shell-Fish.

875

Experiment
Solitary touching the Right Side, and the Left.

876

Experiment
Solitary touching Frictions.

877

crementitious Moisture, which lieth in the *Flesh*: All which helpe *Assimilation*. Frictions also doe more *Fill*, and *Impinguate* the *Body*, than *Exercise*. The Cause is, for that in *Frictions*, the *Inward Parts* are at rest; Which in *Exercise* are beaten (many times) too much: And for the same Reason, (as we have noted heretofore) *Gally-Slaues* are *Fat* and *Fleshy*, because they stirre the *Limmes* more, and the *Inward Parts* lesse.

Experiment
Solitary tou-
ching Globes
appearing Flat
at Distance.

878

ALL Globes afar off appeare *Flat*. The Cause is, for that *Distance* being a *Secondary Object of Sight*, is not otherwise discerned, than by more or lesse *Light*; which *Disparity* when it cannot be discerned, all seemeth *One*: As it is (generally) in *Objects* not distinctly discerned; For so *Letters*, if they be so farre off, as they cannot be discerned, shew but as a *Dusky Paper*: And all *Engravings* and *Embossings*, (a farre off) appeare *Plaine*.

Experiment
Solitary tou-
ching Shadows.

879

THe *Vtmost Parts* of *Shadows* seeme euer to *Tremble*. The Cause is, for that the little *Moats*, which we see in the *Sun*, doe euer *Stirre*, though there be no *wind*: And therefore those *Mouing*, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe shew the *Shadow* to *Moue*, because the *Medium* *Moueth*.

Experiment
Solitary tou-
ching the Row-
ling and Brea-
king of the Seas.

880

SHALLOW and *Narrow Seas*, breake more than *Deepe* and *Large*. The Cause is, for that the *Impulsion* being the same in Both; Where there is greater *Quantitie* of *water*, and likewise *Space* Enough; there the *water* Rowleth and *Moueth*, both more *Slowly*, and with a *Sloper Rise*, and *Fall*: But where there is lesse *water*, and lesse *Space*, and the *water* dasheth more against the *Bottom*, there it *maoueth* more *Swiftly*, and more in *Precipice*; For in the *breaking* of the *waves* there is euer a *Precipice*.

Experiment
Solitary tou-
ching the Dut-
coration of Salt-
water.

881

IT hath beene observed by the *Ancients*, that *Salt water* *Boyled*, or *Boyled* and *Cooled* againe, is more *Potable*, than of it selfe *Raw*: And yet the *Taste* of *Salt* in *Distillations* by *Fire*, riseth not; For the *Distilled water* will be *Fresh*. The Cause may be, for that the *Salt Part* of the *Water*, doth partly rise into a *Kinde* of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottom*: And so is rather a *Separation*, than an *Evaporation*. But it is too grosse to rise into a *Vapour*: And so is a *Bitter Taste* likewise; For *Simple Distilled waters*, of *wormewood*, and the like, are not *Bitter*.

Experiment
Solitary tou-
ching the Re-
turne of Salt-
nesse in Pits vp-
on the Sea-
Shore.

882

IT hath beene set downe before, that *Pits* vpon the *Sea-Shore*, turne into *Fresh water* by *Percolation* of the *Salt* through the *Sand*: But it is further noted, by some of the *Ancients*, that in some *Places* of *Affricke*, after a time, the *Water* in such *Pits* will become *Brackish* againe. The Cause is, for that after a time, the very *Sands*, thorow which the *Salt-water* passeth, become *Salt*; And so the *Strainer* it selfe is tinged with *Salt*.

Salt. The remedy therefore is, to digge still *New Pits*, when the old wax *Brackish*, As if you would change your *Strainer*.

IT hath beene obserued by the *Ancients*, that *Salt water*, will dissolue *Salt* put into it, in lesse time, than *Fresh-water* will dissolue it. The *Cause* may be, for that the *Salt* in the *Precedent water*, doth, by *Similitude* of *Substance*, draw the *Salt* new put in, vnto it; Whereby it diffuseth in the *Liquor* more speedily. This is a Noble *Experiment*, if it be true, For it sheweth *Meanes* of more *Quicke* and *Easie Infusions*; And it is likewise a good *Instance* of *Attraction*, by *Similitude* of *Substance*. Try it with *Sugar* put into *Water*, formerly *Sugred*; And into other *water* *Insugred*.

Experiment
Solitary touching
Attraction by Similitude
of Substance.
883

PVt *Sugar* into *wine*, part of it aboue, part vnder the *wine*; And you shall finde, (that which may seeme strange,) that the *Sugar* aboue the *wine*, will soften and dissolue sooner, than that within the *wine*. The *Cause* is, for that the *wine* entreteth that *Part* of the *Sugar*, which is vnder the *wine*, by *Simple Infusion*, or *Spreading*; But that *Part* aboue the *wine* is likewise forced by *Sucking*: For all *Spungie Bodies* expell the *Aire*, and draw in *Liquor*, if it be *Contiguous*: As we see it also in *Spunges*, put part about the *Water*. It is worthy the *Inquiry*, to see how you may make more *Accurate Infusions*, by helpe of *Attraction*.

Experiment
Solitary touching
Attraction.
884

WATER in *wells* is warmer in *winter*, than in *summer*: And so *Aire* in *Caves*. The *Cause* is, for that in the *Hither Parts*, vnder the *Earth*, there is a *Degree* of some *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which shut close in, (as in *winter*) is the *More*; But if it *Perspire*, (as it doth in *summer*,) it is the *Lesse*.

Experiment
Solitary touching
Heat vnder
Earth.
885

IT is reported, that amongst the *Leucacians*, in *Ancient time*, vpon a *Superstition*, they did vse to precipitate a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with strings, at some distance, many great *Fowles*; And fixing vnto his *Body* diuers *Feathers*, spread, to breake the *Fall*. Certainly many *Birds*, of good *wing*, (As *Kites*, and the like) would beare vp a good *weight* as they flie; And *Spreading* of *Feathers*, thin and close, and in great *Breadth*, will likewise beare vp a great *weight*; Being euen laid, without *Tilting* vpon the *Sides*. The further *Extension* of this *Experiment* for *Flying* may be thought vpon.

Experiment
Solitary touching
Flying in
the Aire.
886

THERE is, in some *Places*, (namely in *Cephalonia*,) a little *Shrub*, which they call *Holy-Oake*, or *Dwarfe-Oake*: Vpon the *Leaves* whereof there riseth a *Tumour*, like a *Blister*; Which they gather, and rub out of it, a certaine *Red Dust*, that conuerteth (after a while) into *wormes*, which they kill with *wine*, (as is reported,) when they begin to *Quicken*: With this *Dust* they die *Scarlet*.

Experiment
Solitary touching
the Dye
of Scarlet.
887

IN *Zant*, it is very ordinary, to make *Men Impotent*, to accompany

Experiment
Solitary tou-

ching *M*isfi-
ciating.

888

Experiment
Solitary tou-
ching the Rise
of Water, by
Meanes of
Flame.

889

Experiments
in Consort
touching the
Influences of
the Moone.

with their *wines*. The like is practised in *Gasconie*; Where it is called *Nouerl'eguillette*. It is practised alwaies vpon the *Wedding Day*. And in *Zant*, the Mothers themselves doe it, by way of Preuention; Because thereby they hinder other *Charmes*, and can vndoe their Owne. It is a Thing the *Ciwill Law* taketh knowledge of; And therefore is of no Light Regard.

IT is a Common *Experiment*, but the *Cause* is mistaken. Take a *Pot*, (Or better a *Glasse*, because therein you may see the *Motion*.) And set a *Candle* lighted in the *Bottom* of a *Basen* of *water*; And turne the *Mouth* of the *Pot*, or *Glasse*, ouer the *Candle*, and it will make the *water* rise. They ascribe it, to the *Drawing* of *Heat*; Which is not true: For it appeareth plainly to be but a *Motion* of *Nexe*, which they call *Ne desur vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as soone as it is covered, being suffocated by the *Close Aire*, lesseneth by little and little: During which time, there is some little *Ascent* of *water*, but not much: For the *Flame* Occupying lesse and lesse Roome, as it lesseneth, the *water* succeedeth. But vpon the *Instant* of the *Candles Going out*, there is a sudden *Rise*, of a great deal of *water*; For that the *Body* of the *Flame* filleth no more Place; And so the *Aire*, and the *water* succeed. It worketh the same *Effect*, if in stead of *water*, you put *Flower*, or *Sand*, into the *Basen*: Which sheweth, that it is not the *Flames* drawing the *Liquour*, as *Nourishment*; As it is supposed; For all *Bodies* are alike vnto it; As it is ever in *Motion* of *Nexe*; Insomuch as I haue seene the *Glasse*, being held by the Hand, hath lifted vp the *Basen*, and all: The *Motion* of *Nexe*, did so Claspe the *Bottom* of the *Basen*. That *Experiment*, when the *Basen* was lifted vp, was made with *Oyle*, and not with *water*: Neuerthelesse this is true, that at the very first *Setting* of the *Mouth* of the *Glasse*, vpon the *Bottom* of the *Basen*, it draweth vp the *water* a little, and then standeth at a *Stay*, almost till the *Candles Going out*, as was said. This may shew some *Attraction* at first: But of this we will speake more, when we handle *Attractions* by *Heat*.

Of the *Power* of the *Celestiall Bodies*, and what more Secret *Influences* they haue, besides the two Manifest *Influences* of *Heat*, and *Light*, We shall speake, when we handle *Experiments* touching the *Celestiall Bodies*: Meane-while, wee will giue some *Directions* for more certaine *Trials*, of the *Vertue* and *Influences* of the *Moone*; which is our *Nearest Neighbour*.

The *Influences* of the *Moone*, (most obserued,) are *Four*. The *Drawing forth* of *Heat*: The *Inducing* of *Purification*: The *Increase* of *Moisture*: The *Exciting* of the *Motions* of *Spirits*.

For

For the *Drawing forth of Heat*, we haue formerly prescribed, to take *Water Warm*, and to let Part of it against the *Moone-Beames*, and Part of it with a *Skreen* between; And to see whether that which standeth Exposed to the *Beames*, will not *Coole* sooner. But because this is but a *Small Interposition*, (though in the *Sun* we see a *Small Shade* doth much,) it were good to try it; when the *Moone* shineth, & when the *Moone* shineth not at all; And with *Water Warne* in a *Glasse-Bottle*; as well as in a *Dish*; And with *Cinders*; And with *Iron Red-Hot*; &c.

890

For the *Inducing of Putrifaction*, it were good to trie it with *Flesh*, or *Fish*, Exposed to the *Moone-Beames*; And againe Exposed to the *Aire*, when the *Moone* shineth not, for the like time; To see whether will corrupt sooner: And trie it also with *Capon*, or some other *Fowle*, layd abroad, to see whether it will mortifie, and become tender sooner? Trie it also with *Dead Flies*, or *Dead wormes*, hauing a little *water* cast vpon them, to see whether will *Putrifie* sooner. Trie it also with an *Apple*, or *Orange*, hauing *Holes* made in their *Tops*, to see whether will Rot or Mould sooner? Trie it also with *Holland-Cheese*, hauing *wine* put into it, whether will breed *Mites* sooner, or greater?

891

For the *Increase of Moisture*, the Opinion Receiued is; That *Seeds* will grow soonest; And *Haire*, and *Nails*, and *Hedges*, and *Herbs*, Cut, &c. will grow soonest, if they be Set, or Cut, in the *Increase* of the *Moone*. Also that *Braines* in *Rabits*, *wood-cockes*, *Calues*, &c. are fullest in the *Full* of the *Moone*: And so of *Marrow* in the *Bones*: And so of *Oysters*, and *Cockles*; which of all the rest are the easiest tried, if you haue them in *Pits*.

892

Take some *Seeds*, or *Roots*, (as *Onions*, &c.) and set some of them immediately after the *Change*; And others of the same kinde immediately after the *Full*. Let them be as Like as can be: The *Earth* also the same as neere as may be; And therefore best in *Pots*: Let the *Pots* also stand, where no *Raine*, or *Sunne* may come to them, lest the *Difference* of the *weather* confound the *Experiment*: And then see in what *Time*, the *Seeds* Set in the *Increase* of the *Moone*, come to a certaine *Height*; And how they differ from those that are Set in the *Decrease* of the *Moone*.

893

It is like, that the *Braine* of *Man* waxeth *Moister*, and *Fuller*, vpon the *Full* of the *Moone*: And therefore it were good for those that haue *Moist Braines*, & are great *Drinkers*; to take *Fume* of *Lignum Aloes*, *Rose-Mary*, *Frankincense*, &c. about the *Full* of the *Moone*. It is like also, that the *Humours* in *Mens Bodies*, Increase, and Decrease, as the *Moone* doth; And therefore it were good to Purge, some day, or two, after the *Full*; For that then the *Humours* will not replenish so soone againe.

894

As for the *Exciting* of the *Motion* of the *Spirits*, you must note that the *Growth* of *Hedges*, *Herbs*, *Haire*, &c. is caused from the *Moone*, by *Exciting* of the *Spirits*, as well by *Increase* of the *Moisture*. But for *Spirits* in particular, the great *Instance* is in *Lunacies*.

895

There may be other *Secret Effects* of the *Influence* of the *Moone*, which are not yet brought into *Observation*. It may be, that if it so fall out,

896

out,

out, that the *Wind* be *North*, or *North-East*, in the *Full* of the *Moone*, it increaseth *Cold*; And if *South*, or *South-West*, it disposeth the *Aire*, for a good while, to *warmth*, and *Raine*; Which would be obserued.

897

It may be, that *Children*, and *Young Cattel*, that are *Brought forth* in the *Full* of the *Moone*, are stronger, and larger, than those that are brought forth in the *wane*: And those also which are *Begotten* in the *Full* of the *Moone*: So that it might be good *Husbandry*, to put *Rams*, and *Bulls* to their *Female*, somewhat before the *Full* of the *Moone*. It may be also, that the *Egges* lay'd in the *Full* of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may be brought into *Observation*: *Quare* also, whether great *Thunders*, and *Earth-Quakes*, be not most in the *Full* of the *Moone*?

Experiment
Solitary tou-
ching *Vinegar*.

898

THe *Turning* of *Wine* to *Vinegar*, is a Kinde of *Putrifaction*: And in *Making* of *Vinegar*, they vse to set *Vessels* of *Wine*, ouer against the *Noone-Sunne*; which calleth out the more *Oily Spirits*, and leaueth the *Liquour* more *Soure*, and *Hard*. Wee see also, that *Burnt-Wine* is more *Hard*, and *Astringent*, than *Wine Vnburnt*. It is said, that *Cider* in *Nauigations* vnder the *Line* ripeneth, when *Wine* or *Beere* soureth. It were good to set a *Rundlet* of *Veriace* ouer against the *Sunne*, in *Summer*, as they doe *Vinegar*, to see whether it will *Ripen*, and *Sweeten*.

Experiment
Solitary tou-
ching *Creatures*
that *Sleepe* all
Winter.

899

THere be diuers *Creatures*, that *Sleepe* all *Winter*; As the *Beare*, the *Hedge-hogge*, the *Bat*, the *Bee*, &c. These all wax *Fat* when they *Sleepe*, and egest not. The *Cause* of their *Fattening*, during their *Sleeping time*, may be the *want* of *Assimilating*; For whatsoeuer *Assimilate*th not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping Time*, haue beene obserued not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remoue*. And they get *warme* and *Close Places* to *Sleepe* in. When the *Flemmings* Wintred in *Noua Zembla*, the *Beares*, about the *Middle* of *November*, went to *Sleepe*; And then the *Foxes* began to come forth, which *Durst* not before. It is noted by some of the *Ancients*, that the *Shee-Bear* breedeth, and lyeth in with their *Young*, during that time of *Rest*: And that a *Beare*, *Bigge* with *Young*, hath seldome beene scene.

Experiment
Solitary tou-
ching the *Ge-
nerating* of
Creatures by *Co-
pulation*, and by
Putrifaction.

900

Some *Living Creatures* are Procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrifaction*; And of those which come by *Putrifaction*, many doe (neuerthelesse) afterwards procreate by *Copulation*. For the *Cause* of both *Generations*: First, it is most certaine, that the *Cause* of all *Vinification*, is a *Gentle*, and *Proportionable Heat*, working vpon a *Glutinous* and *Yeelding Substance*: For the *Heat* doth bring forth *Spirit* in that *Substance*: And the *Substance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirit* is *Detained*, and cannot *Brecke forth*: The Other, that the *Matter* being *Gentle*, and *yeelding*, is driven forwards by the *Motion* of the *Spirits*, after some *Swelling* into *Shape*, and *Members*.

There-

Therefore all *Sperme*, all *Menstruous Substance*, all *Matter* whereof *Creatures* are produced by *Putrifaction*, haue euermore a *Closenesse*, *Lentour*, and *Sequality*. It seemeth therefore, that the *Generation* by *Sperme* only, and by *Putrifaction*, haue two Different *Causes*. The first is, for that *Creatures* which haue a *Definite* and *Exact Shape*, (as those haue which are procreated by *Copulation*,) cannot be produced by a *weake* and *Casual Heat*; Nor out of *Matter*, which is not *exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Vinification* be of any length, then the *Spirit* will *Exhale*, before the *Creature* be *Mature*: Except it be *Enclosed* in a *Place* where it may haue *Continuance* of the *Heat*, *Accesse* of some *Nourishment* to maintaine it, and *Closenesse* that may keepe it from *Exhaling*. And such *Places* are the *wombes*, and *Matrices* of the *Females*. And therefore all *Creatures*, made of *Putrifaction*, are of more *Vncertaine Shape*; and are made in *Shorter Time*; And need not so *Perfect* an *Enclosure*, though some *Closenesse* be commonly required. As for the *Heathen Opinion* which was, that vpon great *Mutations* of the *World*, *Perfect Creatures* were first Engendred of *Concretion*; As well as *Frogs*, and *Wormes*, and *Flies*, and such like, are now; Wee know it to be vaine. But if any such Thing should be admitted, *Discouraging* according to *Sense*, it cannot be, except you admit a *Chaos* first, and *Commixture* of *Heauen*, and *Earth*.

For the *Frame* of the *World*, once in *Order*, cannot effect it by any
Excesse or *Casualty*.

NATV-



NATVRALL HISTORIE.

X. Century.



The Philosophie of Pythagoras, (which was full of Superstition,) did first plant a Monstrous Imagination; Which afterwards was, by the Schoole of Plato, and Others, Watered and Nourished. It was, that the World was One Entire, Perfect, Living Creature; In so much as Appolonius of Tyana, a Pythagorean Prophet, affirmed, that the Ebbing and Flowing of the Sea, was the Respiration of the World, drawing in Water as Breath, and putting it forth againe, They went on, and inferred; That if the World were a Living Creature, it had a Soule, and Spirit; Which also they held, calling it *Spiritus Mundi*; The Spirit or Soule of the World: By Which they did not intend God; (for they did admit of a Deity besides,) But only

Experiments
in Consort,
touching the
Transmission,
and Influx of
Immaterial
Vertues, and
the Force of I-
magination.

only the Soule, or Essentiall Forme of the Vniuerse. This Foundation being laid, they mought build vpon it, what they would; For in a *Liuing Creature*, though neuer so great, (As for Example, in a great *Whale*,) the *Sense*, and the *Affects* of an one Part of the *Body*, instantly make a *Transcursion* throwout the whole *Body*: So that by this they did insinuate, that no *Distance of Place*, nor *Want* or *Indisposition of Matter*, could hinder *Magical Operations*; But that, (for Example,) we mought here in *Europe*, haue *Sense* and *Feeling* of that, which was done in *China*: And likewise, we mought worke any *Effect*, without, and against *Matter*: And this, not Holpen by the *Cooperation* of *Angels*, or *Spirits*, but only by the *Vnity* and *Harmony* of *Nature*. There were some also, that staid not here; but went further, and held; That if the *Spirit of Man*. (whom they call the *Microcosme*,) doe giue a fit touch to the *Spirit* of the *World*, by strong *Imaginations*, and *Beleefes*, it might command *Nature*; For *Paracelsus*, and some darkesome *Authors* of *Magicke*, doe ascribe to *Imagination Exalted*: the *Power of Miracle-working Faith*. With these vast and Bottomlesse *Follies*, *Men* haue beene (in part) entertained.

But we, that hold firme to the *Workes of God*; And to the *Sense*, which is Gods *Lampe*; (*Lucerna Dei Spiraculum Hominis*;) will enquire with all *Sobriety*, and *Seueritie*, whether there be to be found, in the *Foot-Steps of Nature*, any such *Transmission* and *Influx* of *Immateriate Vertues*; And what the *Force of Imagination* is; Either vpon the *Body Imaginant*, or vpon another *Body*: Wherein it will be like that *Labour of Hercules*, in *Purging the Stable of Augeas*, to separate from *Superstitious*, and *Magical Arts*, and *Observations*, any thing that is cleane, and pure *Naturall*; And not to be either *Contemned*, or *Condemned*. And although wee shall haue occasion to speake of this in more places than One, yet we will now make some *Entrance* thereinto.

Experiments
in Consort,
Monitory, touch-
ing Trans-
mission of Spi-
rits, and the
Force of Imagi-
nation.

MEN are to be Admonished, that they doe not withdraw Credit, from the *Operations* by *Transmission of Spirits*, and *Force of Imagination*, because the *Effects* faile sometimes. For as in *Infection*, and *Contagion* from *Body to Body*, (as the *Plague*, and the like,) it is most certaine, that the

the *Infection* is receiued (many times) by the *Body Passive*, but yet is by the *Strength*, and good *Disposition* thereof, Repulsed, and wrought out, before it bee formed into a *Disease*; So much more in *Impressions* from *Minde to Minde*, or from *Spirit to Spirit*, the *Impression* taketh, but is Encountred, and Overcome, by the *Minde* and *Spirit*, which is *Passive* before it worke any manifest *Effect*. And therefore, they worke most vpon *Weake Mindes*, and *Spirites*: As those of *women*; *Sicke Persons*; *Superstitious*, and *Fearefull Persons*; *Children*, and *Young Creatures*.

Nescio quis teneros Oculis mihi fascinat Agnos:

The *Poet* speaketh not of *Sheepe*, but of *Lambs*. as for the *weaknesse* of the *Power* of them, vpon *Kings*, and *Magistrates*; It may be ascribed (besides the maine, which is the *Protection* of *God*, ouer those that Execute his Place) to the *weaknesse* of the *Imagination* of the *Imaginant*: For it is hard for a *witch*, or a *Sorcerer*, to put on a *Beleeve*, that they can hurt such Persons.

Men are to be *Admonished*, on the other side, that they doe not easily giue Place and Credit to these *Operations*, because they *Succeed many times*; For the *Cause* of this *Success*, is (oit) to bee truly ascribed, vnto the *Force* of *Affection* and *Imagination*, vpon the *Body Agent*; And then by a *Secondary Meanes*, it may worke vpon a *Diuers Body*: As for Example, If a man carry a *Planets Seale*, or a *Ring*, or some *Part* of a *Beast*, beleeuing strongly, that it will helpe him to obtaine his *Loue*; Or to keepe him from danger of hurt in *Fight*; Or to preuaile in a *Suit*; &c. it may make him more *Active*, and *Industrious*; And Againe, more *Confident*, and *Persisting*, than otherwise he would be. Now the great *Effects* that may come of *Industry*, and *Perseuerance*, (especially, in *Ciwill Businesse*;) who knoweth not? For wee see *Audacitie* doth almost binde and marte the *weaker Sort* of *Minds*; And the *State* of *Humane Actions* is so variable, that to try Things oft, and neuer to giue ouer, doth Wonders: Therefore, it were a *Meere Fallacie* and *Mistaking*, to ascribe that to the *Force* of *Imagination*, vpon another *Body*, which is but the *Force* of *Imagination* vpon the *Proper Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, worke greatly vpon the *Body* of the *Imaginant*: As we shall shew in due place.

Men are to be *Admonished*, that as they are not to mistake the *Causes* of these *Operations*; So much lesse, they are to mistake the *Fact*, or *Effect*; And rashly to take that for done, which is not done. And therefore, as diuers wise *Iudges* haue prescribed, and cautioned, *Men* may not too rashly beleeue, the *Confessions* of *witches*, nor yet the *Evidence* against them. For the *witches* themselues are *Imaginative*, and beleeue oft-times, they doe that, which they doe not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-craft*. It is worthy the Observing, that both in *Ancient*, and *Late times*, (as in the *Thessalian witches*, and the *Meetings* of *witches* that haue beene recorded by so many late *Confessions*;) the great *wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themselues into

other *Bodies*; &c. are still reported to be wrought, not by *Incantations*, or *Ceremonies*; But by *Ointments*, and *Anointing* themselves all over. This may iustly moue a *Man* to thinke, that these *Fables* are the *Effects* of *Imagination*: For it is certaine that *Ointments* doe all, (if they be laid on any thing thicke) by *Stopping* of the *Pores*, shut in the *Vapours*, and send them to the *Head* extremely. And for the *Particular Ingredients* of those *Magicall Ointments*, it is like they are *Opiate* and *Soporiferous*. For *Anointing* of the *Fore-Head*, *Necke*, *Feet*, *Back-Bone*, we know is vsed for *Procuring Dead Sleepes*: And if any *Man* say, that this *Effect* would bee better done by *Inward Potions*; Answer may bee made, that the *Medicines*, which goe to the *Ointments*, are so strong, that if they were vsed *Inwards*, they would kill those that vse them: And therefore they worke *Potently*, though *Outwards*.

Wee will diuide the *Seuerall Kindes* of the *Operations*, by *Transmission* of *Spirits*, and *Imagination*; Which will giue no small *Light* to the *Experiments* that follow. All *Operations* by *Transmission* of *Spirits*, and *Imagination* haue this; That they *Worke at Distance*, and not at *Touch*; And they are these being distinguished.

904 The first is the *Transmission* or *Emission*, of the *Thinner*, and more *Airie Parts* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the rest, the most *Corporeall*. But you must remember withall, that there be a *Number* of those *Emissions*, both *wholesome*, and *Unwholesome*, that giue no *Smell* at all: For the *Plague*, many times, when it is taken, giueth no *Scent* at all: And there be many *Good* and *Healthfull Aires*, that doe appeare by *Habitation*, and other *Prooves*, that differ not in *Smell* from other *Aires*. And vnder this *Head*, you may place all *Imbibitions* of *Aire*, where the *Substance* is *Materiall*, *Odour-like*; Whereof some neuertheless are strange, and very suddenly diffused; As the *Alteration*, which the *Aire* receiueth in *Egypte*, almost immediately, vpon the *Rising* of the *River* of *Nilus*, whereof we haue spoken.

905 The Second is the *Transmission* or *Emission* of those *Things* that we call *Spiritual Species*; As *Visibles* and *Sounds*: The one whereof wee haue handled; And the other we shall handle in due place. These moue swiftly, and at great distance; But then they require a *Medium* well disposed, And their *Transmission* is easily stopped.

906 The Third is the *Emissions*, which cause *Attraction* of *Certaine Bodies* at *Distance*; Wherein though the *Loadstone* be commonly placed in the *First Ranke*, yet we thinke good to except it, and referre it to another *Head*: But the *Drawing* of *Amber*, and *Ies*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Siluer*, at distance; And the *Attraction* of *Heat* at distance; And that of *Fire* to *Naphtha*; And that of some *Herbs* to *water*, though at distance; And diuers others; We shall handle, but yet not vnder this present *Title*, but vnder the *Title* of *Attraction* in generall.

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The Fourth is the *Emission* of *Spirits*; and *Immaterial Powers* and *Vertues*, in those Things, which worke by the *Vniuersall Configuration*, and *Sympathy* of the *world*; Not by *Formes*, or *Celestiall Influxes*, (as is vainly taught and receiued,) but by the *Primitive Nature* of *Matter*, and the *Seeds* of *Things*. Of this kinde is, (as we yet suppose,) the *Working* of the *Load-Stone*, which is by *Consent* with the *Globe* of the *Earth*: Of this Kinde is the *Motion* of *Gravity*, which is by *Consent* of *Dense Bodies*, with the *Globe* of the *Earth*: Of this kinde is some *Disposition* of *Bodies* to *Rotation*, and particularly from *East* to *west*: Of which kinde wee conceiue the *Maine Float* and *Re-float* of the *Sea* is, which is by *Consent* of the *Vniuerse*, as Part of the *Diurnall Motion*. These *Immaterial Vertues* haue this Property differing from Others; That the *Diuersity* of the *Medium* hindreth them not; But they passe thorow all *Mediums*; yet at *Determinate distances*. And of these we shall speake, as they are incident to seuerall *Titles*.

The Fifth is the *Emissions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, vpon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be vehement; And the *Operation* of the *Imagination*, if it bee Strong. But these two are so Coupled, as we shall handle them together: For when an *Enuious*, or *Amorous Aspect*, doth infect the *Spirits* of Another, there is Ioynd both *Affection*, and *Imagination*.

The Sixth is, the *Influxes* of the *Heavenly Bodies*, besides those two Manifest Ones, of *Heat*, and *Light*. But these we will handle, where we handle the *Celestiall Bodies*, and *Motions*.

The Seuenth is the *Operations* of *Sympathy*; Which the *writers* of *Naturall Magicke* haue brought into an *Art* or *Precept*: And it is this; That if you desire to Super-induce, any *Vertue* or *Disposition*, vpon a *Person*, you should take the *Living Creature*, in which that *Vertue* is most *Eminent*, and in *Perfection*: Of that *Creature* you must take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Again, you must take those *Parts*, in the *Time*, and *Act*, when that *Vertue* is most in *Exercise*; And then you must apply it to that *Part* of *Man*, wherein that *Vertue* chiefly *Consisteth*. As if you would Super-induce *Courage* and *Fortitude*, take a *Lion*, or a *Cock*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cock*: Take those *Parts* immediately after the *Lion*, or the *Cock* haue beene in *Fight*; And let them be worne, vpon a *Mans Heart*, or *wrest*. Of these and such like *Sympathies*, we shall speake vnder this present *Title*.

The Eighth and last is, an *Emission* of *Immaterial Vertues*. Such as we are a little doubtfull to Propound; It is so prodigious: But that it is so constantly auouched by many: And wee haue set it downe, as a *Law* to our Selues, to examine things to the *Bottom*; And not to receiue vpon *Credit*, or reiect vpon *Improbabilities*, vntill there hath passed a due *Examination*. This is, the *Sympathy* of *Individuals*: For as

there is a *Sympathy of Species*; So (it may be) there is a *Sympathy of Individuals*: That is, that in *Things*, or the *Parts of Things*, that haue beene once *Contiguous*, or *Entire*, there should remaine a *Transmission of Vertue*, from the One to the Other: As betweene the *weapon* and the *wound*. Whereupon is blazed abroad the *Operation of Unguentum Teli*: And so of a *Peece of Lard*, or *Sticke of Elder*, &c. that if *Part* of it be Consumed or Putrified, it will worke vpon the other *Part Senered*. Now wee will pursue the *Instances* themselves.

Experiments
in Consort
touching Emis-
sion of Spirits
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THe *Plague* is many times taken, without *Manifest Sense*, as hath bin said. And they report, that where it is found, it hath a Sent, of the *Smell of a Mellow Apple*; And (as some say) of *May-Flowers*: And it is also receiued, that *Smells of Flowers*, that are *Mellow and Lushious*, are ill for the *Plague*; As *white Lillies*, *Cowslips*, and *Hyacinths*.

The *Plague* is not easily receiued by such, as continually are about them, that haue the *Plague*; As *Keepers of the Sicke*, and *Physitians*; Nor againe by such as take *Antidotes*, either Inward, (as *Mithridate*; *Iuniper-Berries*; *Rue*, *Leafe and Seed*; &c.) Or outward, (as *Angelica*, *Zedoary*, and the like, in the Mouth; *Tarre*, *Galbanum*, and the like, in Perfume;) Nor againe by *Old People*, and such as are of a *Dry and Cold Complexion*. On the other side, the *Plague* taketh soonest hold of those that come out of a *Fresh Aire*; And of those that are *Fasting*; And of *Children*; And it is likewise noted to goe in a *Bloud*, more than to a *Stranger*.

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The most *Pernicious Infection*, next the *Plague*, is the *Smell of the Tayle*; When *Prisoners* haue beene Long, and Close, and Nastily kept; Whereof we haue had, in our time, Experience, twice, or thrice; when both the *Judges* that sate vpon the *Tayle*, and Numbers of those that attended the *Businesse*, or were present, *Sickned* vpon it, and *Died*. Therefore it were good wisdome, that in such Cases, the *Tayle* were Aired, before they be brought forth.

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Out of question, if such *Foule Smells* bee made by *Art*, and by the Hand, they consist chiefly of *Mans Flesh*, or *Sweat*, *Putrified*; For they are not those *Stinkes*, which the *Nostrils* Streight abhorre, and expell, that are most *Pernicious*; But such *Aires*, as haue some Similitude with *Mans Body*; And so insinuate themselves, and betray the *Spirits*. There may be great danger, in vsing such Compositions in great Meetings of People, within Houses; As in *Churches*; At *Arraignments*; At *Plays* and *Solemnities*; And the like; For *Poisoning of Aire* is no lesse dangerous than *Poisoning of water*; Which hath beene vsed by the *Turkes* in the *Warres*; And was vsed by *Emanuel Commenus* towards the *Christians*, when they passed thorow his *Countrey* to the *Holy Land*. And these *Empoisonments of Aire*, are the more dangerous in *Meetings of People*; Because the much *Breath of People*, doth further the *Reception of the Infection*: And therefore where any such Thing is feared, it were good, those *Publique Places* were perfumed, before the *Assemblies*.

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The *Empoisonment of Particular Persons*, by *Odours*, hath beene reported

ported to be in *Perfumed Gloues*, or the like: And it is like, they Mingle the *Poison* that is deadly, with some *Smells* that are Sweet; which also maketh it the sooner received. *Plagues* also haue beene raised by *Anointings* of the *Chinkes* of *Doores*, and the like; Not so much by the Touch, as for that it is common for *Men*, when they finde any thing Wet vpon their *Fingers*, to put them to their *Nose*; Which Men therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious Aires*, cannot bee made without *Danger* of *Death*, to them that make them. But then againe, they may haue some *Antidotes* to saue themselves; So that *Men* ought not to be secure of it.

There haue beene, in diuers *Countries*, great *Plagues*, by the *Putrefaction*, of great *Swarmes* of *Grasse-Hoppers*, and *Locusts*, when they haue beene dead, and cast vpon *Heaps*.

It hapneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poisonous Nature* of the *Mineralls*: And those that deale much in *Refining*, or other *Workes* about *Metalls*, and *Mineralls*, haue their *Brains* Hurt and Stupified by the *Mesalline Vapors*. Amongst which, it is noted, that the *Spirits* of *Quick-Siluer*, either fly to the *Skull*, *Teeth*, or *Bones*; In so much as *Gilders* vse to haue a *Peece* of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Siluer*; Which *Gold* afterwards they finde to be *Whitened*. There are also certaine *Lakes* and *Pits*, such as that of *Auernus*, that *Poison Birds* (as is said) which fly ouer them; Or *Men*, that stay too long about them.

The *Vapour* of *Char-Coale*, or *Sea-Coale*, in a *Close Roome*, hath killed many: And it is the more dangerous, because it commeth without any *Ill Smell*; But stealeth on by little and little; Enducing only a *Faintnesse*, without any *Manifest Strangling*. When the *Dutch-Men* Wintred at *Nova Zembla*, and that they could gather no more *Sticks*, they fell to make *Fire* of some *Sea-Coale* they had, wherewith (at first) they were much refreshed; But a little after they had sit about the *Fire*, there grew a *Generall Silence*, and lothnesse to speake amongst them; And immediately after, One of the *weakest* of the *Company*, fell downe in a *Sowne*; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and so saued themselves. The *Effect* (no doubt) is wrought by the *Inspissation* of the *Aire*; And so of the *Breath* and *Spirits*. The like ensueth in *Roomes* newly *Plastered*, if a *Fire* be made in them; Whereof no lesse *Man* than the Emperour *Iouinianus* Died.

Vide the *Experiment*, 803. touching the *Infectious Nature* of the *Aire*, vpon the first *Showres*, after a long *Drought*.

It hath come to passe, that some *Apothecaries*, vpon *Stamping* of *Coloquintida*, haue beene put into a great *Skoaring*, by the *Vapour* only.

It hath beene a *Practice* to burne a *Pepper*, they call *Gimay-Pepper*; Which hath such a strong *Spirit*, that it protoketh a *Continuall Sneezing*, in those that are in the *Roome*.

It is an *Ancient Tradition*, that *Bleare-Eyes* infect *Sound-Eyes*; And that a *Menstruous Woman*, looking vpon a *Glasse*, doth rust it. Nay they

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have an *Opinion*, which seemeth *Fabulous*; That *Menstruous women*, going ouer a *Field*, or *Garden*, doe *Corne* and *Herbs* good by *Killing* the *Wormes*.

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The *Tradition* is no lesse *Ancient*, that the *Basiliske* killeth by *Aspect*; And that the *wolfe*, if he see a *Man* first, by *Aspect* striketh a *Man* hoarse.

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Perfumes Conuenient doe dry and strengthen the *Braine*; And stay *Rheumes* and *Defluxions*; As we finde in *Fume* of *Rose-Mary* dried, and *Lignum Aloes*, and *Calamus*, taken at the *Mouth*, and *Nostrils*; And no doubt there be other *Perfumes*, that doe moisten and refresh; And are fit to be vsed in *Burning Agues*, *Consumptions*, and too much *wakefulness*; Such as are, *Rose-water*, *Vinegar*, *Limon-pils*, *Violets*, the *Leaues* of *Vines* sprinckled with a little *Rose-water*, &c.

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They doe vse in *Sudden Faintings*, and *Swonnings*, to put a *Handkerchiefe* with *Rose-water*, or a *Little Vinegar*, to the *Nose*; Which gathereth together againe the *Spirits*, which are vpon point to resolute, and fallaway.

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Tobacco comforteth the *Spirits*, and dischargeth *wearinesse*; Which it worketh partly by *Opening*; But chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to try the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*.) of other *Things*; As well to dry and comfort, as for other *Intentions*. I wish *Triall* be made of the *Drying Fume*, of *Rose-Mary*, and *Lignum Aloes*, before mentioned, in *Pipe*; And so of *Nutmeg*, and *Folium Indum*; &c.

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The *Following* of the *Plough*, hath beene approued, for refreshing the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *wheat*, or *Rie*, is not so good; Because the *Earth* hath spent her *Sweet Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it, when you sow *Barley*. But because *Ploughing* is tied to *Seasons*, it is best to take the *Aire* of the *Earth*, new turned vp, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themselves much good by kneeling vpon a *Cushion*, and *weeding*. And these *Things* you may practise in the best *Seasons*; Which is euer the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest Earth* you can chuse. It would be done also, when the *Dew* is a little off the *Ground*, lest the *Vapour* be too *Moist*. I knew a great *Man*, that liued Long, who had a *Cleane Clod* of *Earth*, brought to him euery *Morning*, as he fate in his *Bed*; And he would hold his *Head* ouer it, a good pretty while. I Commend also, sometimes, in *Digging* of *New Earth*, to powre in some *Malmesey*, or *Greeke wine*; That the *Vapour* of the *Earth*, and *wine* together, may comfort the *Spirits*, the more; Prouided alwaies, it be not taken for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

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They haue, in *Physicke*, Vse of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Prouoking* of *Sleepe*, &c. For though those *Things* be not so Strong as *Perfumes*, yet you may haue them continually in your *Hand*; whereas *Perfumes* you can take but at

Times;

Times; And besides, there be diuers *Things*, that breath better of themselves, than when they come to the *Fire*; As *Nigella Romana*, the *Seed* of *Melanthium*, *Amomum*, &c.

There be two *Things*, which (inwardly vsed) doe Cople and condense the *Spirits*; And I with the same to be tried outwardly in *Vapours*. The one is *Nitre*, which I would haue dissolved in *Malmesey*, or *Greeke-wine*, and so the *Smell* of the *wine* taken; or if you would haue it more forcible, poure of it vpon a *Fire-pan*, well heated, as they doe *Rose-water*, and *Vinegar*. The other is, the *Distilled water* of *wilde Poppy*; which I wish to be mingled, at halfe, with *Rose water*, and so taken with some *Mixture* of a few *Cloues*, in a *Perfuming-Pan*. The like would be done with the *Distilled Water* of *Saffron Flowers*.

Smells of *Muske*, and *Amber*, and *Ciuit*, are thought to further *Venerous Appetite*: Which they may doe by the *Refreshing* and *Calling forth* of the *Spirits*.

Incense, and *Nidorous Smells*, (such as were of *Sacrifices*,) were thought to Intoxicate the *Braine*, and to dispose *Mento* to *Denotion*: Which they may doe, by a kinde of *Sadnesse*, and *Contristation* of the *Spirits*: And partly also by *Heating*, and *Exalting* them. We see that amongst the *Jewes*, the *Principall Perfume* of the *Sanctuary*, was forbidden all *Common Vses*.

There be some *Perfumes*, prescribed by the *writers* of *Naturall Magicke*, which procure *Pleasant Dreames*; And some others, (as they say,) that procure *Propheticall Dreames*; As the *Seeds* of *Flax*, *Fleawort*, &c.

It is certaine that *Odours* doe, in a small *Degree*, *Nourish*; Especial-ly the *Odour* of *Wine*: And we see men a hungred, doe loue to smell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *woman*, in the *House*, complaine, that she should be kept from being at a *Feast*, and *Solemnity*, (which she much desired to see,) because there would be a *Corps* in the *House*; Whereupon he caused *Loaves* of *New Bread* to be sent for, and opened them, And powred a litle *Wine* into them; And so kept himselfe aliue with the *Odour* of them, till the *Feast* was past. I knew a *Gentleman*, that would fast (sometimes) three or foure, yea five dayes, without *Meat*, *Bread*, or *Drinke*; But the same *Man* vsed to haue continually, a great *wispe* of *Herbs*, that he smelled on: and amongst those *Herbs*, some *Esculent Herbs* of strong *Sent*; As *Onions*, *Garlicke*, *Leekes*, and the like.

They doe vse, for the *Accident* of the *Mother*, to burne *Feathers*, and other *Things* of ill *Odour*: And by those ill *Smells*, the *Rising* of the *Mother* is put downe.

There be *Aires*, which the *Physitians* aduise their *Patients* to remoue vnto, in *Consumptions*, or vpon *Recovery* of *Long Sicknesse*: which (commonly) are *Plaine Champaignes*, but *Grasing*, and not *Ouer-growne* with *Health*, or the like: Or else *Timber-Shades*, as in *Forrests*, and the like. It is noted also, that *Groues* of *Bayes* doe forbid *Pestilent Aires*: Which was

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accounted a great Cause of the Wholesome Aire of Antiochia. There be also some Soyles that put forth *Odorate Herbs* of themselves; As wilde Thyme; wilde Maïoram; Penny-Roiall; Camomill; And in which the Briar-Roses smell almost like Muske-Roses; Which (no doubt) are Signes that doe discover an Excellent Aire.

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It were good for Men, to thinke of hauing Healthfull Aire; in their Houses; Which will neuer be; if the Roomes be Low-roofed, or full of windows, and Doores; For the one maketh the Aire Close, and not Fresh; And the other maketh it Exceeding Vnequall; Which is a great Enemy to Health. The windows also should not be high vp to the Roofe, (which is in vse for Beautie, and Magnificence,) but low. Also Stone-walls are not wholesome; But Timber is more wholesome; And especially Brick. Nay it hath beene vsed by some, with great Successe, to make their walls thicke; And to put a Lay of Chalke betweene the Bricks, to take away all Dampishnesse.

Experiment
Solitary tou-
ching the E-
missions of Spi-
rituall Species
which Affect
the Senses.

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These Emissions, (as we said before,) are handled, and ought to be handled, by themselves, vnder their Proper Title: That is, *Visibles*, and *Audibles*, each a-part: In this place, it shall suffice to giue some generall Observations, Common to both. First, they seeme to be Incorporeall. Secondly, they Worke swiftly. Thirdly, they Worke at Large Distances. Fourthly, in Curious Varieties. Fifthly, they are not Effectiue of any Thing; Nor leaue no worke behinde them; But are Energies meere-ly; For their Working vpon Mirrours, and places of Echo, doth not alter any Thing in those Bodies; But it is the same Action with the Originall, only Repercussed. And as for the Shaking of windows, or Rarefying the Aire by Great Noyses; And the Heat caused by Burning-Glasses; They are rather Concomitants of the Audible, and Visible Species, than the Effects of them. Sixthly, they seeme to be of so Tender, and weake a Nature, as they affect onely such a Rare, and Attenuate Substance, as is the Spirit of Liuing Creatures.

Experiments
in Consort,
touching the
Emission of Im-
materiate Ver-
tues from the
Mindes, and
Spirits of Men,
either by Affe-
ctions, or by
Imaginations, or
by other Im-
pressions.

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It is mentioned in some Stories, that where Children haue beene Exposed, or taken away young from their Parents; And that afterwards they haue approached to their Parents presence, the Parents, (though they haue not knowne them,) haue had a Secret Ioy, or Other Alteration thereupon.

There was an Egyptian South-Sayer, that made Anthonius beleue, that his Genius, (which otherwise was Braue, and Confident,) was, in the Presence of Octavianus Cesar, Poore, and Cowardly: And therefore, he aduised him, to absent himselfe, (as much as hee could,) and remoue farre from him. This South-Sayer was thought to bee suborned by Cleopatra, to make him liue in Egypt, and other Remote Places from Rome. Howsoeuer the Conceit of a Predominant or Mastering Spirit, of one Man ouer Another, is Ancient, and Receiued still, euen in Vulgar Opinion.

There

There are Conceits, that some *Men*, that are of an *ill*, and *Melancholy* Nature, doe incline the *Company*, into which they come, to bee *Sad*, and *ill* disposed; And contrariwise, that Others, that are of a *Ioniall* Nature, doe dispose the *Company* to be *Merry* and *Cheerfull*. And againe, that some *Men* are *Luckie* to be kept *Company* with, and *Employed*; And Others *Unluckie*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spirit* to *Spirit*, when *Men* are in *Presence*, one with another, as well as from *Body* to *Body*.

It hath beene obserued, that *Old Men*, who haue loued *Young Company*, and beene *Conuersant* continually with them, haue beene of *Long Life*; Their *Spirits*, (as it seemeth,) being *Recreated* by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which euer had *Young Auditors*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who liued till they were an *Hundred* yeares *Old*. And so likewise did many of the *Grammarians*, and *Schoole-Masters*; such as was *Orbilius*, &c.

Audacitie and *Confidence* doth, in *Ciuill* *Businesse*, so great Effects, as a *Man* may (reasonably) doubt, that besides the very *Daring*, and *Earnestnesse*, and *Persisting* and *Importunitie*, there should be some *Secret Binding*, and *Stooping* of other *Mens* *Spirits*, to such *Persons*.

The *Affections*, (no doubt) doe make the *Spirits* more *Powerfull*, and *Active*; And especially those *Affections*, which draw the *Spirits*, into the *Eyes*: Which are two: *Loue*, and *Enuy*, which is called *Oculus Malus*: As for *Loue*, the *Platonists*, (some of them,) goe so farre, as to hold that the *Spirit* of the *Louer*, doth passe into the *Spirits*, of the *Person Loued*; Which causeth the desire of *Returne* into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contact*, and *Coniunction*, which is in *Louers*. And this is obserued likewise, that the *Aspects* that procure *Loue*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Enuy*, that emitteth some *Maligne* and *Poisonous Spirit*, which taketh hold of the *Spirit* of Another, And is likewise of greatest Force, when the *Cast* of the *Eye* is *Oblique*. It hath beene noted also, that it is most *Dangerous*, when an *Enuious Eye* is cast vpon *Persons* in *Glory*, and *Triumph*, and *Ioy*. The *Reason* whereof is, for that, at such times, the *Spirits* come forth most, into the *Outward Parts*, and so meet the *Percussion* of the *Enuious Eye*, more at *Hand*: And therefore it hath beene noted, that after great *Triumphs*, *Men* haue beene ill disposed, for some *Dayes* following. Wee see the *Opinion* of *Fascination* is *Ancient*, for both *Effects*: Of *Procuring Loue*; And *Sicknesse* caused by *Enuy*: And *Fascination* is euer by the *Eye*. But yet if there be any such *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Presence*, and not by the *Eye* alone; Yet most forcibly by the *Eye*.

Feare, and *Shame*, are likewise *Infectiue*, for wee see that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Countenance* in a *Company*, others doe likewise *Blush* in his behalfe.

Now

Now we will speake of the Force of *Imagination* vpon other *Bodies* ; And of the *Meanes* to Exalt and Strengthen it. *Imagination*, in this Place, I vnderstand to be, the Representation of an *Indiuiduall Thought*. *Imagination* is of three Kinds : The First *Ioynd* with *Beleeefe* of that which is to Come : The Second *Ioynd* with *Memory* of that which is Past : And the Third is of *Things Present*, or as if they were *Present* ; For I comprehend in this, *Imaginations Faigned*, and at *Pleasure* ; As if one should *Imagine* such a *Man* to be in the *Vestments* of a *Pope* ; Or to haue *Wings*. I single out, for this time, that which is with *Faith*, or *Beleeefe* of that which is to Come. The *Inquisition* of this *Subiect*, in our way, (which is by *Induction*.) is wonderfull hard ; for the *Things* that are reported, are Full of *Fables* ; And *New Experiments* can hardly be made, but with *Extreme Caution*, for the Reason which we will hereafter declare.

The *Power* of *Imagination* is in three Kindes ; The First, vpon the *Body* of the *Imaginant* ; Including likewise the *Childe* in the *Mothers Wombe* ; The Second is, the *Power* of it vpon *Dead Bodies*, as *Plants*, *Wood*, *Stone*, *Metall*. &c. The Third is, the *Power* of it, vpon the *Spirits* of *Men* and *Liuing Creatures* : And with this last we will only meddle.

The *Probleme* therefore is, whether a *Man* *Constantly* and *Strongly Beleeuing*, that such a *Thing* shall be ; As that such an *One* will *Loue Him* ; Or that such an *One* will *Grant him* his *Request* ; Or that such an *One* shall *Recouer* a *Sickenesse* ; Or the like ;) It doth helpe any thing to the *Effecting* of the *Thing* it selfe. And here againe we must warily distinguish ; For it is not meant, (as hath beene partly said before,) that it should helpe by *Making* a *Man* more *Stout*, or more *Industrious* ; (In which kinde a *Constant Beleeefe* doth much ;) But meere by a *Secret Operation*, or *Binding*, or *Changing* the *Spirit* of *Another* : And in this it is hard, (as we began to say,) to make any *New Experiment* ; For I cannot *command* my *Selfe* to *Beleeue* what I will, and so no *Triall* can be made. Nay it is worse ; For whatloeuer a *Man* *Imagineth* *doubtingly*, or with *Feare*, must needs doe hurt, if *Imagination* haue any *Power* at all ;

For

For a *Man* representeth that oftner, that he feareth, than the contrary.

The Helpe therefore is, for a *Man* to worke by *Another*, in whom hee may Create *Beleeve*, and not by *Himselfe*; Vntill *Himselfe* haue found by *Experience*, that *Imagination* doth preuaile; For then *Experience* worketh in *Himselfe* *Beleeve*; If the *Beleeve*, that such a *Thing* shall be, be ioyned with a *Beleeve*, that his *Imagination* may procure it.

For Example; I related one time to a *Man*, that was Curious, and Vaine enough in these Things; That I saw a Kinde of Iugler, that had a Paire of Cards, and would tell a *Man* what Card he thought. This Pretended Learned Man told me; It was a Mistaking in Me; For (said he) it was not the Knowledge of the Mans Thought, (for that is proper to God,) but it was the Inforcing of a Thought vpon him, and Binding his Imagination by a Stronger, that he could Thinke no other Card. And thereupon he asked me a Question, or two, which I thought he did but cunningly, knowing before what vsed to be the Feats of the Iugler. Sir, (said he,) doe you remember whether he told the Card, the Man thought, Himselfe, or bade Another to tell it. I answered (as was true;) That he bade Another tell it. Whereunto he said; So I thought: For (said he) Himselfe could not haue put on so strong an Imagination; But by telling the other the Card, (who beleeued that the Iugler was some Strange Man, and could doe Strange Things,) that other Man caught a strong Imagination. I harkened vnto him, thinking for a Vanity he spoke prettily. Then he asked me another Question: Saith he, Doe you remember whether he bade the Man thinke the Card first, and afterwards told the other Man in his Eare, what hee should thinke, Or else that he did whisper first in the Mans Eare, that should tell the Card, telling that such a Man should thinke such a Card, and after bade the Man thinke a Card? I told him, as was true; That he did first whisper the Man in the Eare, that such a Man should thinke such a Card: Vpon this the Learned Man did much Exult, and Please himselfe, saying; Loe, you may see that my Opinion is right: For if the Man had thought first, his Thought had bene Fixed; But the other Imagining first, bound his Thought. Which though it did somewhat sinke with mee, yet I made Lighter than I thought, and said; I thought it was Confederacie, betweene the Iugler, and the two Seruants: Though (Indeed) I had no Reason so to thinke: For they were both my Fathers Seruants; And he had neuer plaid in the House before. The Iugler also did cause a Garter to be held vp; And tooke vpon him, to know, that such a One, should point in such a Place, of the Garter; As it should be neare so many Inches to the Longer End, and so many to the shorter; And still he did it, by First Telling the Imaginer, and after Bidding the Actor Thinke.

Hauing told this Relation, not for the Weight thereof, but because

because it doth handſomely open the Nature of the *Queſtion* ; I returne to that I ſaid; That *Experiments* of *Imagination*, muſt be practiſed by Others, and not by a *Mans* Selfe. For there be Three *Meanes* to fortifie *Beleeſe* : the *Fiſt* is *Experience* : The *Second* is *Reason* : And the *Third* is *Authority* : And that of theſe, which is farre the moſt *Potent*, is *Authoritie* : For *Beleeſe* vpon *Reason* or *Experience* will *Stagger*.

947

For *Authority*, it is of two *Kindes* : *Beleeſe* in an *Art* ; And *Beleeſe* in a *Man*. And for Things of *Beleeſe* in an *Art* ; A man may exerciſe them by *Himſelfe* ; But for *Beleeſe* in a *Man*, it muſt be by *Another*. Therefore, if a *Man* beleeue in *Aſtologie*, and finde a *Figure* *Proſperous* ; Or beleeue in *Naturall Magicke*, that a *Ring* with ſuch a *Stone*, or ſuch a *Peece* of a *Living Creature*, Carried, will doe good ; It may helpe his *Imagination* : But the *Beleeſe* in a *Man* is farre the more *Active*. But howſoeuer all *Authority* muſt be out of a *Mans* Selfe, turned (as was ſaid,) either vpon an *Art*, or vpon a *Man* : And where *Authority* is from one *Man* to another, there the *Second* muſt be *Ignorant*, and not *Learned*, or *Full of Thoughts* ; And ſuch are (for the moſt part) all *Witches*, and *Superſtitious Perſons* ; Whoſe *Beleeſes*, tied to their *Teachers*, and *Traditions* are no whit controlled, either by *Reason* or *Experience* : And vpon the ſame *Reason*, in *Magicke*, they uſe (for the moſt part,) *Boyes*, and *Young People*, whoſe *Spirits* eaſieſt take *Beleeſe* and *Imagination*.

Now to fortifie *Imagination*, there be three *Wayes* : The *Authority* whence the *Beleeſe* is deriued ; *Meanes* to *Quicken* and *Corroborate* the *Imagination* ; And *Meanes* to *Repeat* it, and *Refresh* it.

948

For the *Authoritie*, wee haue already ſpoken ; As for the *Second* ; Namely the *Meanes* to *Quicken*, and *Corroborate* the *Imagination* ; We ſee what hath beene vſed in *Magick* ; (If there be in thoſe *Practiſes* any thing that is purely *Naturall* ;) As *Vestments* ; *Characters* ; *Words* ; *Seales* ; Some *Parts* of *Plants*, or *Living Creatures* ; *Stones* ; *Choice* of the *Houre* ; *Gestures* and *Motions* ; Alſo *Incenſes*, and *Odours* ; *Choice* of *Society*, which increaſeth *Imagination* ; *Diets* and *Preparations* for ſome time before. And for *words*, there haue beene euer vſed, either *Barbarous words*, of no *Senſe*, leſt they ſhould diſturbe the *Imagination* ; Or *words* of *Similitude*, that may ſecond and feed the *Imagination* : And this was euer as well in *Heathen Charmes*, as in *Charmes* of latter *Times*. There are vſed alſo *Scripture words*. For that the *Beleeſe*, that *Religious Texts*, and *words*, haue *Power*, may ſtrengthen the *Imagination*. And for the ſame *Reason*, *Hebrew Words*, (which amongſt vs is counted the *Holy Tongue*, and the *Words* more *Mysticall*,) are often vſed.

949

For the *Refreshing* of the *Imagination*, (which was the *Third Meanes* of *Exalting* it ;) Wee ſee the *Practiſes* of *Magicke*, as in *Images* of *Wax* and

and the like, that should Melt, by little, and little; Or some other Things Buried in Mucke, that should Putrifie by little and little; Or the like: For so oft as the *Imaginant* doth thinke of those Things, so oft doth he represent to his *Imagination*, the Effect of that he desireth.

If there be any Power in *Imagination*, it is lesse credible, that it should be so *Incorporeall* and *Imateriate* a *Vertue*, as to work at great Distances; Or through all *Mediums*; Or upon all *Bodies*: But that the Distance must be Competent; The *Medium* not Aduerse; And the *Body* Apt and Proportionate. Therefore if there be any Operation vpon *Bodies*, in Absence, by Nature; it is like to be conueyed from *Man* to *Man*, as Fame is; As if a *Witch* by *Imagination*, should hurt any as farre off, it cannot bee naturally, but by Working vpon the *Spirit* of some, that commeth to the *Witch*; And from that *Party* vpon the *Imagination* of Another; And so vpon Another; till it come to one that hath resort to the *Party Intended*; And so by Him to the *Party intended* himselfe. And although they speake, that it sufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Party*, or the like; yet there is lesse Credit to be giuen to those Things, except it be by Working of euill *Spirits*.

The *Experiments*, which may certainly demonstrate the Power of *Imagination*, vpon other *Bodies*, are few, or none: For the *Experiments* of *Witchcraft*, are no cleare Prooves; For that they may bee, by a *Tacite Operation* of *Maligne Spirits*: We shall therefore be forced, in this *Enquirie*, to resort to *New Experiments*: Wherein wee can giue only *Directions* of *Trials*, and not any *Positiue Experiments*. And if any *Man* thinke, that we ought to haue staid, till We had made *Experiment*, of some of them our selues (as wee doe commonly in other *Titles*) the Truth is, that these *Effects* of *Imagination* vpon other *Bodies*, haue so little Credit with vs, as we shall try them at leisure: But in the meane Time, we will lead others the way.

When you worke by the *Imagination* of Another, it is necessary, that Hee, by whom you worke, haue a *Precedent Opinion* of you, that you can doe Strange Things, Or that you are a *Man of Art*, as they call it; For else the Simple *Affirmation* to Another, that this or that shall be, can worke but a weake *Impression* in his *Imagination*.

It were good, because you cannot discern fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did vse the *Imagination* of more than One; That so you may light vpon a *Strong One*. As if a *Physitian* should tell Three, or Foure, of his *Patients Seruants*, that their *Master* shall surely recouer.

The *Imagination* of One, that you shall vse, (such is the Variety of *Mens Minds*;) cannot be alwaies alike *Constant*, and *Strong*. And if the

Successes follow not speedily, it will faint and lesse *Strength*. To remedy this, you must pretend to Him, whose *Imagination* you vie, severall *Degrees of Meanes*, by which to *Operate*; As to prescribe him, that euery three Daies, if he finde not the Successes Apparant, he doe vse another *Root*, or *Part* of a *Beast*, or *Ring*, &c. As being of more *Force*; And if that faile, Another; And it that, Another; till Seuen Times. Also you must prescribe a good Large Time for the *Effect* you promise; As if you should tell a *Servant* of a *Sick-man*, that his *Master* shall recover, but it will be Fourteene daies, ere hee findeth it apparantly, &c. All this to entertaine the *Imagination*, that it wauer lesse.

954

It is certaine, that *Potions*, or *Things* taken into the *Body*: *Incenses* and *Perfumes* taken at the *Nostrils*; And *Ointments* of some *Parts*; doe (naturally) worke vpon the *Imagination* of Him that taketh them. And therefore it must needs greatly *Cooperate* with the *Imagination* of him, whom you vse, if you prescribe him, before he doe vse the *Receit*, for the worke which he desireth, that hee doth take such a *Pill*, or a *Spoonfull* of *Liquor*; Or burne such an *Incense*; Or *Anoint* his *Temples*, or the *Soles* of his *Feet*, with such an *Ointment*, or *Oyle*: And you must chuse, for the *Composition* of such *Pill*, *Perfume*, or *Ointment*, such *Ingredients*, as doe make the *Spirits*, a little more *Grosse*, or *Muddy*: Whereby the *Imagination* will fix the better.

955

The *Body Passive*, and to be wrought vpon, (I meane not of the *Imaginant*), is better wrought vpon (as hath beene partly touched) at some *Times*, than at others: As if you should prescribe a *Servant*, about a *Sick Person* (whom you haue possessed, that his *Master* shall recover) when his *Master* is fast a sleepe, to vse such a *Root*, or such a *Root*. For *Imagination* is like to worke better vpon *Sleeping Men*, than *Men Awake*. As we shall shew when we handle *Dreames*.

956

We finde in the *Art of Memory*, that *Images Visible*, worke better than other *Conceits*: As if you would remember the Word *Philosophy*, you shall more surely do it, by *Imagining* that such a *Man*, (For *Men* are best *Places*) is reading vpon *Aristotles Physickes*; Than if you should *Imagine* him to say; I le goe study *Philosophy*. And therefore, this *Observation* would be translated to the *Subiect* wee now speake of: For the more *Lustrous* the *Imagination* is, it filleth and fixeth the better. And therefore I conceiue, that you shall, in that *Experiment* (whereof wee spake before) of *Binding of Thoughts*, lesse faile, if you tell One, that such an One shal name one of *Twenty Men*, than if it were One of *Twenty Cards*. The *Experiment* of *Binding of thoughts*, would be *Diversified*, and tried to the Full: And you are to note, whether it hit for the most part, though not alwaies.

957

It is good to consider, vpon what *Things*, *Imagination* hath most *Force*: And the *Rule* (as I conceiue) is, that it hath most *Force* vpon *Things*, that haue the *Lightest*, and *Easiest Motions*. And therefore aboue all, vpon the *Spirits of Men*: And in them, vpon such *Affections*, as moue *Lightest*; As vpon *Procuring of Loue*; *Binding of Lust*, which is

euer

euier with *Imagination*; vpon *Men in Feare*; Or *Men in Irresolution*; And the like. Whatsoeuer is of this kinde would be thoroughly enquired. *Trialls* likewise would be made vpon *Plants*, and that diligently: As if you should tell a *Man*, that such a *Tree* would Die this yeare; And will him, at these and these times, to goe vnto it, to see how it thriueth. As for *Inanimate Things*, it is true, that the *Motions* of *Shuffling* of *Cards*, or *Casting* of *Dice*, are very *Light Motions*; And there is a *Folly* very vsuall, that *Gamesters* imagine, that some that stand by them, bring them ill Lucke. There would be *Triall* also made, of holding a *Ring* by a *Threed* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more; Or of Holding a *Key* betweene two *Mens Fingers*, without a *Charme*; And to tell those that hold it, that at such a *Name*, it shall goe off their *Fingers*: For these two are Extreme *Light Motions*. And howsoeuer I haue no *Opinion* of these things, yet so much I conceiue to be true; That *Strong Imagination* hath more Force vpon *Things Liuing*; Or that haue beene *Liuing*, than *Things* meere *Inanimate*: And more Force likewise vpon *Light*, and *Subtile Motions*, than vpon *Motions Vehement*, or *Ponderous*.

It is an vsuall *Observation*, that if the *Body* of One *Murthered*, bee brought before the *Murtherer*, the *wounds* will bleed a-fresh. Some doe affirme, that the *Dead Body*, vpon the Presence of the *Murtherer*, hath opened the *Eyes*; And that there haue beene such like *Motions*, as well where the *Party Murthered* hath beene *Strangled*, or *Drowned*, as where they haue beene *Killed* by *wounds*. It may be, that this participateth of a *Miracle*, by *Gods* Iust Iudgement, who vsually bringeth *Murthers* to Light; But if it be *Naturall*, it must be referred to *Imagination*.

The *Tying* of the *Points* vpon the day of *Marriage*, to make *Men* Impotent towards their *wives*, which (as we haue formerly touched,) is so frequent in *Zane* and *Gaseony*, if it be *Naturall*, must bee referred to the *Imagination* of *Him* that *Tieth* the *Point*. I conceiue it to haue the lesse Affinity with *witchcraft*, because not Peculiar Persons onely, (such as *wiches* are) but any *Body* may doe it.

There be many *Things* that worke vpon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Precious Stones*, worne, haue beene anciently and generally Received; And curiously assigned to worke seuerall *Effects*. So much is true; That *Stones* haue in them fine *Spirits*; As appeareth by their *Splendor*: And therefore they may worke by *Consent* vpon the *Spirits* of *Men*, to Comfort, and Exhilarate them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth Orientall*, and the *Gold-Stone*, which is the *Tellow Topaze*. As for their particular *Proprieties*, there is no Credit to be giuen to them. But it is manifest, that *Light*, aboue all things, excelleth in *Comforsing* the *Spirits* of *Men*: And it is very probable, that *Light Varied* doth the same *Effect*, with more *Novelty*. And this is one of the *Causes*, why *Precious Stones* comfort. And therefore it were good to haue *Tinted Lanthornes*,

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Experiments
in Consort,
touching the
Secret Vertue of
Sympathy, and
Antipathy.

960

or Tinted Skreenes, of Glasse Cloured into Greene, Blew, Carnation, Crimson, Purple, &c. And to vie them with Candles in the Night. So likewise to haue Round Glasses, not only of Glasse Coloured thorow, but with Colours laid betweene Crystals, with Handles to hold in ones Hand. Prismes are also Comfortable Things. They haue of Paris-worke, Looking-Glasses, bordered with broad Borders of small Crystall, and great Counterfeit Precious Stones, of all Colours that are most Glorious and Pleasant to behold; Especially in the Night. The Pictures of Indian Feathers, are likewise Comfortable, and Pleasant to behold. So also Faire and Cleere Pooles doe greatly comfort the Eyes and Spirits; Especially when the Sun is not Glaring, but Over-cast; Or when the Moone shineth.

961

There be diuers Sorts of Braceless fit to Comfort the Spirits; And they be of Three Intentions: Refrigerant; Corroborant; and Aperient. For Refrigerant, I wish them to be of Pearle, or of Corall, as is vsed: And it hath beene noted that Corall, if the Party that weareth it be ill disposed, will wax Pale: Which I beleue to be true, because otherwise Distemper of Heat will make Corall lose Colour. I Commend also Beads, or little Plates of Lapis Lazuli; And Beads of Nitre, either alone, or with some Cordiall Mixture.

962

For Corroboration and Confortation, take such Bodies as are of Astringent Quality, without Manifest Cold. I commend Bead-Amber; which is full of Astriction, but yet is Viscuous, and not Cold; And is conceiued to Impinguate those that weare such Beads: I commend also, Beads of Harts-Horne, and Iuory, which are of the like Nature; Also Orange-Beads; Also Beads of Lignum Aloes, Macerated first in Rose-water, and Dried.

963

For Opening, I Commend Beads, or Peeces of the Roots of Cardus Benedictus: Also of the Roots of Piony the Male; And of Orris; And of Calamus Aromaticus; And of Rew.

964

The Crampe (no doubt,) commeth of Contraction of Sinnewes; Which is Manifest, in that it commeth either by Cold or Drinesse, As after Consumptions, and Long Agues: For Cold and Drinesse doe (both of them) Contract, and Corrugate. Wee see also, that Chafing a little about the Place in paine, easeth the Crampe; Which is wrought by the Dilatation, of the Contracted Sinnewes, by Heat. There are in vse for the Preuention of the Crampe, two Things; The one Rings of Sea Horse-Teeth, worne vpon the Fingers; The other Bands of Greene Periwinkle (the Herbe) tied about the Calfe of the Leg, or the Thigh, &c. where the Crampe vseth to come. I doe finde this the more strange, because Neither of these haue any Relaxing Vertue, but rather the Contrary. I iudge therefore, that their working is, rather vpon the Spirits, within the Nerves, to make them stricke lesse; Than vpon the Bodily Substance of the Nerves.

965

I would haue Triall made of two other Kindes of Bracelets, for Comforting the Heart, and Spirits; The one of the Trochisch of Vipers, made into little Peeces of Beads; For since they doe great Good Inwards (especially for Pestilent Agues) it is like they will be Effectuall Outwards; Where they may be applied in greater Quantity. There would be Trochisch likewise made

made of *Snakes*; Whose *Flesh* dried, is thought to haue a very *Opening*, and *Cordiall Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the Principall *Ingredient* in their *Cordiall Confection Alkermes*: The *Beads* would bee made vp with *Amber-Grice*, and some *Pomander*.

It hath beene long received, and confirmed by diuers *Trialls*; That the Root of the *Male-Piony*, dried, tied to the *Necke*, doth helpe the *Falling-Sicknesse*; And likewise the *Incubus*, which wee call the *Mare*. The Cause of both these *Diseases*, and especially of the *Epilepsie* from the *Stomach*, is the *Grossenesse* of the *Vapours*, which rise and enter into the *Cells* of the *Braine*: And therefore the *working* is, by *Extreme*, and *Subtil Attenuation*, Which that *Simple* hath. I Iudge the like to be in *Castoreum*, *Muske*, *Rew-Seed*, *Agnus Castus Seed*, &c.

There is a *Stone*, which they call the *Bloud-Stone*, which womē is thought to be good for them that *Bleed* at the *Nose*: Which (no doubt) is by *Astriction* and *Cooling* of the *Spirits*. *Quare*, if the *Stone* taken out of the *Toads Head*, be not of the like *Vertue*? For the *Toad* loueth *Shade*, and *Coolenesse*.

Light may bee taken from the *Experiment* of the *Horse-Tooth-Ring*, and the *Garland* of *Periwinkle*, how that those things which assuage the *Strife* of the *Spirits*, doe helpe diseases, contrary to the *Intention* desired: For in the *Caring* of the *Crampe*, the *Intention* is to relax the *Sinewes*; But the *Contraction* of the *Spirits*, that they strue lesse, is the best *Helpe*: So to procure easie *Trauailes* of *women*, the *Intension* is to bring downe the *Childe*; But the best *Helpe* is, to stay the *Comming* downe too *Fast*: Whereunto they say, the *Toad-Stone* likewise helpeth. So in *Pestilent Feuers*, the *Intention* is to expell the *Infection* by *Sweat*, and *Evaporation*; But the best *Meanes* to doe it, is by *Nitre*, *Diascordium*, and other *Cool Things*, which doe for a time arrest the *Expulsion*, till *Nature* can doe it more quietly. For as one saith prettily; *In the Quenching of the Flame of a Pestilent Ague*, *Nature* is like *People*, that come to quench the *Fire of a House*; which are so busie, as one of them letteth another. Surely, it is an *Excellent Axiome*, and of *Manifold Vse*, that whatsoeuer appeareth the *Contention* of the *Spirits*, furthereth their *Action*.

The *writers* of *Naturall Magicke*, commend the *Wearing* of the *Spoile* of a *Snake*, for *Preseruing* of *Health*. I doubt it is but a *Conceit*; For that the *Snake* is thought to renew her *Youth*, by *Casting* her *Spoile*. They might as well take the *Beake* of an *Eagle*, or a *Peece* of a *Harts-Horne*, because those *Renue*.

It hath beene *Anciently Received*, (For *Pericles* the *Athenian* vsed it,) and it is yet in *vse*, to weare little *Bladders* of *Quick-Silver*, or *Tablets* of *Arsenicke*, as *Preseruatives* against the *Plague*: Not as they conceiue, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poisons* themselves, they draw the *Venome* to them, from the *Spirits*.

Vide the *Experiments* 95. 96. and 97. touching the *Seuerall Sympathies*, and *Antipathies*, for *Medicinall Vse*.

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It is said, that the *Guts* or *skin* of a *wolfe* being applied to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beast* of great *Edacity*, and *Disgestion*; And so it may bee, the *Parts* of him comfort the *Bowels*.

973

We see *Scare-Crowes*, are set vp to keepe *Birds* from *Corn*, and *Fruit*; It is reported by some, that the *Head* of a *Wolfe*, whole, dried, and hangd vp in a *Dove-Houfe*, will scare away *Vermine*; Such as are *Weasils*, *Polcats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For those *Vermine* with vs, know *Dogs* better than *wolfes*.

974

The *Brains* of some *Creatures* (when their *Heads* are roasted) taken in *Wine*, are said to strengthen the *Memory*: As the *Brains* of *Hares*, *Brains* of *Hens*; *Brains* of *Deeres*, &c. And it seemeth, to bee incident to the *Brains* of those *Creatures*, that are Fearefull.

975

The *Ointment* that *witches* vse, is reported to bee made of the *Fat* of *Children*, digged out of their *Graues*; Of the *Juyces* of *Smallage*, *wolfebane*, and *Cinquefoile*; Mingled with the *Meale* of fine *wheat*. But I suppose that the *Soporiferous Medicines* are likeliest to doe it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-Leaves*, &c.

976

It is reported by some, that the *Affections* of *Beasts*, when they are in *Strength*, doe adde some *Vertue*, vnto *Inanimate Things*; As that the *Skin* of a *Sheepe*, deuoured by a *wolfe*, moueth *itching*; That a *Stone* bitten by a *Dog* in *Anger*, being throwne at him, drunke in *Powder*, prouoketh *Choler*.

977

It hath beene obserued, that the *Diet* of *Women* with *Childe*, doth worke much vpon the *Infans*; As if the *Mother* eat *Quinces* much, and *Coriander-Seed* (the *Nature* of both which is to repress and stay *Vapours*, that ascend to the *Braine*) it will make the *Childe* *Ingenious*: And on the contrary side, if the *Mother* eat (much) *Onions*, or *Beanes*, or such *Vaporous Food*; Or drinke *Wine*, or *Strong Drinke*, immoderately; Or *Fast* much; Or be giuen to much *Musing*; (All which send, or draw *Vapours* to the *Head*;) It endangereth the *Childe* to become *Lunaticke*, or of *Imperfect Memory*: And I make the same Iudgement of *Tobacco*, often taken by the *Mother*.

978

The *Writers* of *Naturall Magicke* report, that the *Heart* of an *Ape*, worne neere the *Heart*, comforteth the *Heart*, and increaseth *Audacity*. It is true, that the *Ape* is a *Merry* and *Bold Beast*. And that the same *Heart* likewise of an *Ape*, applied to the *Necke* or *Head*, helpeth the *wit*; And is good for the *Falling-Sicknesse*: The *Ape* also is a *Witty Beast*, and hath a *Dry Braine*; Which may be some *Cause* of *Attenuation* of *Vapours* in the *Head*. Yet it is said to moue *Dreames* also. It may be, the *Heart* of a *Man* would doe more, but that it is more against *Mens Mindes* to vse it; Except it be in such as were the *Reliques* of *Saints*.

979

The *Flesh* of a *Hedge-Hog*, Dressed and Eaten, is said to be a great *Drier*: It is true, that the *Juyce* of a *Hedge-Hog*, must needs be *Harsh* and *Dry*, because it putteth forth so many *Prickles*: For *Plants* also, that are full of *Prickles*,

Prickles, are generally Drie: As *Briars*, *Thornes*, *Berberries*: And therefore the *Ashes* of a *Hedge-Hog* are said to bee a great *Desiccative* of *Fistula's*.

Mummy hath great force in *Stanching* of *Bloud*; which, as it may be ascribed to the *Mixture* of *Balmes*, that are *Glutinous*; So it may also partake of a *Secret Propriety*; In that the *Bloud* draweth *Mans Flesh*. And it is approued, that the *Mosse* which groweth vpon the *Skull* of a *Dead Man* vnburied, will stanch *Bloud* potently. And so doe the *Dregs*, or *Powder* of *Bloud*, seuered from the *Water*, and *Dried*.

It hath beene practised, to make *white Swallowes*, by *Annointing* of the *Egges* with *Oyle*. Which *Effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Iuyce*, that putteth forth the *Feathers* afterwards, more *Penurious*. And it may be, the *Annointing* of the *Egges*, will be as *Effectuall* as the *Annointing* of the *Body*; Of which *Vide* the *Experiment* 93.

It is reported, that the *white* of an *Egge*, or *Bloud*, mingled with *Salt-water*, doth gather the *Saltinesse*, and maketh the *water* sweeter. This may be by *Adhesion*; As in the 6. *Experiment* of *Clarification*: It may be also that *Bloud*, and the *white* of an *Egge*, (which is the *Matter* of a *Living Creature*,) haue some *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. We see that *Salt*, laid to a *Cut finger*, healeth it, So as it seemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*.

It hath beene anciently receiued, that the *Sea-Hare*, hath an *Antipathy* with the *Lungs*, (if it commeth neare the *Body*,) and erodeth them. Whereof the *Cause* is conceiued to be, a *Quality* it hath of *Heating* the *Breath*, and *Spirits*; As *Cantharides* haue vpon the *watirie Parts* of the *Body*; As *Urine* and *Hydropicall water*. And it is a good *Rule*, that what-soeuer hath an *Operation* vpon certaine *Kinds* of *Matters*, that, in *Mans Bodie*, worketh most vpon those *Parts*, wherein that *Kind* of *Matter* aboundeth.

Generally, that which is *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathie* with the same *Thing*, when it is *Aliue*, and when it is *Sound*; And with those *Parts*, which doe *Excern*: As a *Carkasse* of *Man* is most *Infectious*, and *Odious* to *Man*; A *Carrion* of an *Horse* to an *Horse*, &c. *Purulent Matter* of *wounds*, and *Vlcers*, *Carbuncles*, *Pockes*, *Scabs*, *Leprosie*, to *Sound Flesh*; And the *Excrement* of euery *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are lesse *Pernicious* than the *Corruptions*.

It is a *Common Experience*, that *Dogs* know the *Dog-Killer*, When as in times of *Infection*, some *Petty Fellow* is sent out to kill *Dogs*; And that though they haue neuer scene him before, yet they will all come forth, and barke, and fly at him.

The *Relations* touching the *Force* of *Imagination*, and the *Secret Instincts* of *Nature*, are so vncertaine, as they require a great deale of *Examination*, ere we conclude vpon them. I would haue it first throughly inquired, whether there be any *Secret Passages* of *Sympathy*, betweene

Persons

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Persons of neare Bloud; As Parents, Children, Brothers, Sisters, Nurse-Children, Husbands, Wiues, &c. There be many Reports in History, that vpon the Death of Persons of such Nearenesse, Men haue had an inward Feeling of it. I my Selfe remember, that being in Paris, and my Father dying in London, two or three dayes before my Fathers death, I had a Dreame, which I told to diuers English Gentlemen; That my Fathers House in the Countrey, was Plastered all ouer with Blacke Mortar. There is an Opinion abroad, (whether Idle or no I cannot say,) That louing and kinde Husbands, haue a Sense of their wiues Breeding Childe, by some Accident in their owne Bodie.

987

Next to those that are Neare in Bloud, there may be the like Passage, and Instincts of Nature, betweene great Friends, and Enemies: And sometimes the Reuealing is vnto Another Person, and not to the Party Himselfe. I remember Philippus Comminens, (a graue VVriter,) reporteth, That the Arch-Bishop of Vienna, (a Reuerend Prelate,) said (one day) after Masse, to King Lewis the eleuenth of France; *Sir your Mortall Enemy is dead; What time Duke Charles of Burgundy was Slaine, at the Battell of Granson, against the Switzers.* Some triall also would be made, whether Paſſion or Agreement doe any thing; As if two Friends should agree, that such a Day in euery weeke, they being in farre Distant Places, should Pray one for Another; Or should put on a Ring, or Tablet, one for anothers Sake; Whether if one of them should breake their Vow and Promise, the other should haue any Feeling of it, in Absence.

988

If there be any Force in Imaginations and Affections of Singular Persons; It is Probable the Force is much more in the Ioynt Imaginations and Affections of Multitudes: As if a Victory should be won, or lost, in Remote Parts, whether is there not some Sense thereof, in the People whom it concerneth; Because of the great Ioy or Griefe, that many Men are posselt with, at once? Pius Quintus, at the very time, when that Memorable Victory was won, by the Christians, against the Turkes, at the Nauall Battell of Lepanto, being then hearing of Causes in Consistory, brake off suddenly, and said to those about him, *It is now more time, we should giue thanks to God, for the great Victory he hath graunted vs against the Turkes.* It is true, that Victory had a Sympathy with his Spirit; For it was meereley his Worke, to conclude that League. It may be, that Reuelation was Diuine; But what shall we say then, to a Number, of Examples, amongst the Grecians, and Romans? Where the People, being in Theaters at Plaies haue had Newes of Victories, and Ouerthrowes, some few dayes, before any Messenger could come.

It is true, that that may hold in these Things, which is the generall Root of Superstition: Namely, that Men obserue when Things Hit, and not when they Misse: And commit to Memory the one, And forget and passe ouer the other. But touching Diuination, and the Misgiuing of Mindes, wee shall

shall speake more, when we handle in generall, the *Nature of Minds, and Soules, and Spirits.*

We haue giuen formerly some *Rules of Imagination*; And touching the *Fortifying* of the Same. We haue set downe also some few *Instances, and Directions*, of the *Force of Imagination*, vpon *Beasts, Birds, &c.* vpon *Plants*, And vpon *Inanimate Bodies*: Wherein you must still obserue, that your *Trialls* be vpon *subtill and Light Motions*, and not the contrary; For you will sooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating*, or *Flying*, And I leaue it to euery *Man*, to choole *Experiments*, which himselfe thinketh most *Commodious*; Giuing now but a few *Examples* of euery of the *Three Kindes*.

989

Vse some *Imaginant*, (obseruing the *Rules* formerly prescribed,) for *Binding* of a *Bird* from *Singing*; And the like of a *Dog* from *Barking*. Trie also the *Imagination* of some, whom you shal accommodate with things to fortifie it, in *Cocke-fights*, to make one *Cocke* more *Hardy*, and the other more *Cowardly*. It would be tried also in *Flying* of *Hawkes*; Or in *Coursing* of a *Deere*, or *Hare*, with *Grey-Hounds*; Or in *Horse-Races*; And the like *Comparatiue Motions*: For you may sooner by *Imagination*, quicken or slacke a *Motion*, than raise or cease it; As it is easier to make a *Dog* goe slower, than to make him stand still that he may not runne.

990

In *Plants* also, you may trie the *Force of Imagination*; vpon the *Lighter Sort of Motions*: As vpon the *Sudden Fading*, or *Liuely Comming* vp of *Herbs*; Or vpon their *Bending* one way, or other; Or vpon their *Closing*, and *Opening*; &c.

991

For *Inanimate Things*, you may trie the *Force of Imagination*, vpon *Staying* the *Working* of *Beere*, when the *Barme* is put in; Or vpon the *Comming* of *Butter*, or *Cheese*, after the *Cherming*, or the *Rennet* bee put in.

992

It is an *Ancient Tradition*, euery where alleaged, for *Example* of *Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long *Sticke*, doth stupefie the *Hand* of him that toucheth it. It is one degree of *working at Distance*, to worke by the Continuance of a *Fit Medium*; As *Sound*, will be conueyed to the *Eare*, by striking vpon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*.

993

The *Writers* of *Naturall Magicke*, doe attribute much to the *Vertues*, that come from the *Parts of Liuing Creatures*; So as they be taken from them, the *Creatures* remaining still alieue: As if the *Creature* still liuing did infuse some *Immateriate Vertue*, and *Vigour*, into the *Part Seuered*. So much may be true; thar any *Part*, taken from a *Liuing Creature*, newly slaine, may be of greater force, than if it were taken from the like *Creature*, dying of it *Selfe*, because it is fuller of *Spirit*.

994

Triall would be made, of the like *Parts of Indiuidualls*, in *Plants*, and *Liuing Creatures*; As to cut off a *Stocke* of a *Tree*; And to lay that, which you cut off, to *Putrifie*, to see whether it will *Decay* the *Rest* of the *Stocke*: Or if you should cut off part of the *Taile*, or *Legge* of a *Dogge*,

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or

or a *Cat*, and lay it to *Putrifie*, and so see whether it will *Fester* or keepe from *Healing*, the *Part* which remaineth.

996

It is receiued, that it helpeth to *Continue Loe*, if one weare a *Ring*, or a *Bracelet*, of the *Haire* of the *Party Beloued*. But that may be by the *Exciting* of the *Imagination*: And perhaps a *Gloue*, or other like *Fauour*, may as well doe it.

997

The *Sympathie* of *Indiuidualls*, that haue beene *Entire*, or haue *Touched*, is of all others the most *Incredible*: Yet according vnto our faithfull *Manner of Examination of Nature*, we will make some little mention of it. The *Taking away* of *warts*, by *Rubbing* them with somewhat that afterwards is put to waste, and consume, is a *Common Experiment*: And I doe apprehend it the rather, because of mine owne *Experience*. I had, from my *Childhood*, a wart vpon one of my *Fingers*; Afterwards when I was about *Sixteene Yeares* old, being then at *Paris*, there grew vpon both my *Hands* a Number of *warts*, (at the least an hundred,) in a *Moneths Space*. The *English Embassadours Ladie*, who was a *woman* farre from *Superstition*, told me, one day; Shee would helpe mee away with my *warts*: Whereupon shee got a *Peece of Lard*, with the *Skin* on; and rubbed the *warts* all ouer, with the *Fat Side*; And amongst the rest that *Wart*, which I had had from my *Childhood*; Then shee nailed the *Peece of Lard*, with the *Fat* towards the *Sunne*, vpon a *Post* of her *Chamber Window*, which was to the *South*. The *Successe* was, that within *five weekes space*, all the *warts* went quite away: And that *wart*, which I had so long endured, for *Company*. But at the rest I did little maruell, because they came in a *Short time*, and might goe away in a *Short Time* againe: But the *Going away* of that, which had stayed so long, doth yet stick with me. They say the like is done, by the *Rubbing* of *warts* with a *Greene Elder Sticke*, and then *Burying* the *Sticke* to *Rot* in *Mucke*. It would be tryed, with *Cornes*, and *Wens*, and such other *Excreescences*. I would haue it also tried, with some *Parts* of *Liuing Creatures*, that are nearest the *Nature* of *Excreescences*; As the *Combs* of *Cocks*, the *Spurres* of *Cocks*, the *Hornes* of *Beasts*, &c. And I would haue it tried both waies; Both by *Rubbing* those *Parts* with *Lard* or *Elder*, as before; And by *Putting off* some *Peece* of those *Parts*, and laying it to *Consume*; To see whether it will *Worke* any *Effect*, towards the *Consumption* of that *Part* which was once *Ioyned* with it.

998

It is constantly Receiued, and Auouched, that the *Anointing* of the *weapon*, that maketh the *wound*, will heale the *wound* it selfe. In this *Experiment*, vpon the Relation of *Men of Credit*, (though my selfe, as yet, are not fully inclined to beleue it,) you shall note the *Points* following. First, the *Ointment*, wherewith this is done, is made of *Diuers Ingredients*; whereof the *Strangest* and *Hardest* to come by, are the *Mosse* vpon the *Skull* of a dead *Man*, *Vnburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. These two last I could easily suspect to be prescribed as a *Starting Hole*; That if the *Experiment* proued not, it might be pretended, that the *Beasts* were not killed in the due *Time*; For

For as for the *Mosse*, it is certain, there is great Quantity of it in *Ireland* vpon *Slaine Bodies*, laid on *Heapes*, *Unburied*. The other *Ingredients* are, the *Blond-Stone* in *Powder*, and some other *Things*, which seem to haue a *Virtue* to *Stanch Blood*; As also the *Mosse* hath. And the *Description* of the whole *Ointment* is to be found in the *Chymical Dispensatory* of *Crollius*. Secondly, the same *Kinde* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but only applied to the *weapon*. Thirdly, (which I like well) they do not obserue the *Consecrating* of the *Ointment* vnder any certaine *Constellation*; which commonly is the *Excuse* of *Magickall Medicines*, when they faile, that they were not made vnder a fit *Figure* of *Heauen*. Fourthly, it may be applied to the *weapon*, though the *Party Hurt* be at great *Distance*. Fifthly, it seemeth the *Imagination* of the *Party*, to be *Cured*, is not needfull to *Concurre*; For it may be done, without the *Knowledge* of the *Party Wounded*; And thus much hath beene tried, that the *Ointment* (for *Experiments* sake,) hath beene wiped off the *weapon*, without the *knowledge* of the *Partie Hurt*, and presently the *Party Hurt*, hath beene in great *Rage* of *Paine*, till the *weapon* was *Reanoined*. Sixthly, it is affirmed, that if you cannot get the *weapon*, yet if you put an *Instrument* of *Iron*, or *wood*, resembling the *weapon*, into the *wound*, whereby it bleedeth, the *Anointing* of that *Instrument* will serue, and worke the *Effect*. This I doubt should be a *Deuice*, to keep this strange *Forme* of *Cure*, in *Request*, and *Vse*; Because many times you cannot come by the *weapon* it selfe. Seuenthly, the *wound* must be at first *washed cleane*, with *white Wine*, or the *Parties owne Water*; And then bound vp close in *Fine Linnen*, and no more *Dressing* renewed; till it be *whole*. Eightly, the *Sword* it selfe must be *Wrapped vp Close*, as farre as the *Ointment* goeth, that it taketh no *wind*. Ninthly, the *Ointment*, if you wipe it off from the *Sword*, and keepe it, will *Serue* againe; and rather *Increase* in *vertue*, than *Diminish*. Tenthly, it will *Cure* in farre *Shorter Time*, than *Ointments* of *wounds* commonly doe. Lastly, it will *Cure* a *Beast*, as well as a *Man*, which I like best of all the rest, because it subiecteth the *Mat-ter*, to an *Easie Triall*.

I Would haue *Men* know, that though I reprehend, the *Easie Passing* *ouer*, of the *Causes* of *Things*, by *Ascribing* them to *Secret* and *Hidden Vertues*, and *Proprieties*;) For this hath arrested, and laid asleepe, all true *Enquiry*, and *Indications*;) yet I doe not vnderstand, but that in the *Practicall Part* of *Knowledge*, much will be left to *Experience*, and *Proba-tion*, whereunto *Indication* cannot so fully reach: And this not onely in *Specie*, but in *Indiuiduo*. So in *Physicke*, if you will cure the *Iaundies*, it is not enough to say, that the *Medicine* must not be *Cooling*; For that wil hinder the *Opening* which the *Disease* requireth: That it must not be *Hot* For that will exasperate *Choler*: That it must goe to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receiue from *Experience*, that *Powder* of *Chamæpyris*, or the like, drunke in *Beere*, is good for the *Iaundies*: So againe, a wise *Physitian* doth not continue

Still

Experiment
Solitary, rou-
ching Secret
Proprieties.

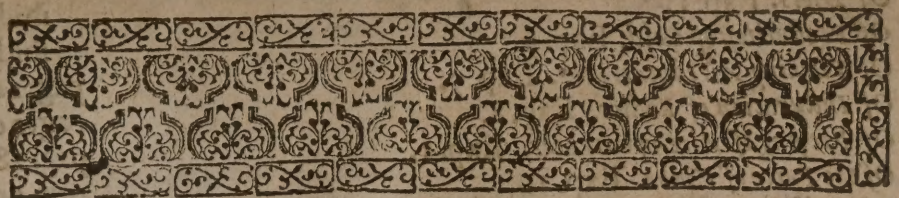
999

still the same *Medicine*, to a *Patient*; But he will vary, if the first *Medicine* doth not apparantly succeed: For of those *Remedies*, that are good for the *Iundies*, *Stone*, *Agues*, &c. that will do good in one *Body*; which will not doe good in Another; According to the Correspondence the *Medicine* hath to the *Individuall Bodie*.

Experiment
Solitary, touch-
ing the Ge-
nerall Sympathy
of Mens Spirits.
1000

THe Delight which Men have in *Popularitie*, *Fame*, *Honour*, *Submissi-
on*, & *Subiection* of other Mens *Minds*, *Wils*, or *Affections*, (although
these *Things* may be desired for other *Ends*) seemeth to be a *Thing*, in it
selfe, without Contemplation of Consequence, Gratefull and agreea-
ble to the *Nature* of *Man*. This *Thing* (surely) is not without some Sig-
nification, as if all *Spirits* and *Soules* of *Men*, came forth out of one *Di-
vine Limbus*; Else why should *Men* be so much affected with that, which
others thinke, or say? The best Temper of *Mindes* desireth *Good
Name*, and *True Honour*: The *Lighter*, *Popularity*, and *Ap-
plause*; The more depraved, *Subiection*, and *Tyranny*;
As is seene in great *Conquerours*, and *Troublers* of
the *world*: And yet more in *Arch-Heretikes*;
for the *Introducing* of new *Doctrines*, is
likewise an *Affectation* of *Tyrannie*,
ouer the *Vnderstandings*,
and *Beleefes* of
Men.

A



A TABLE OF the Experiments.

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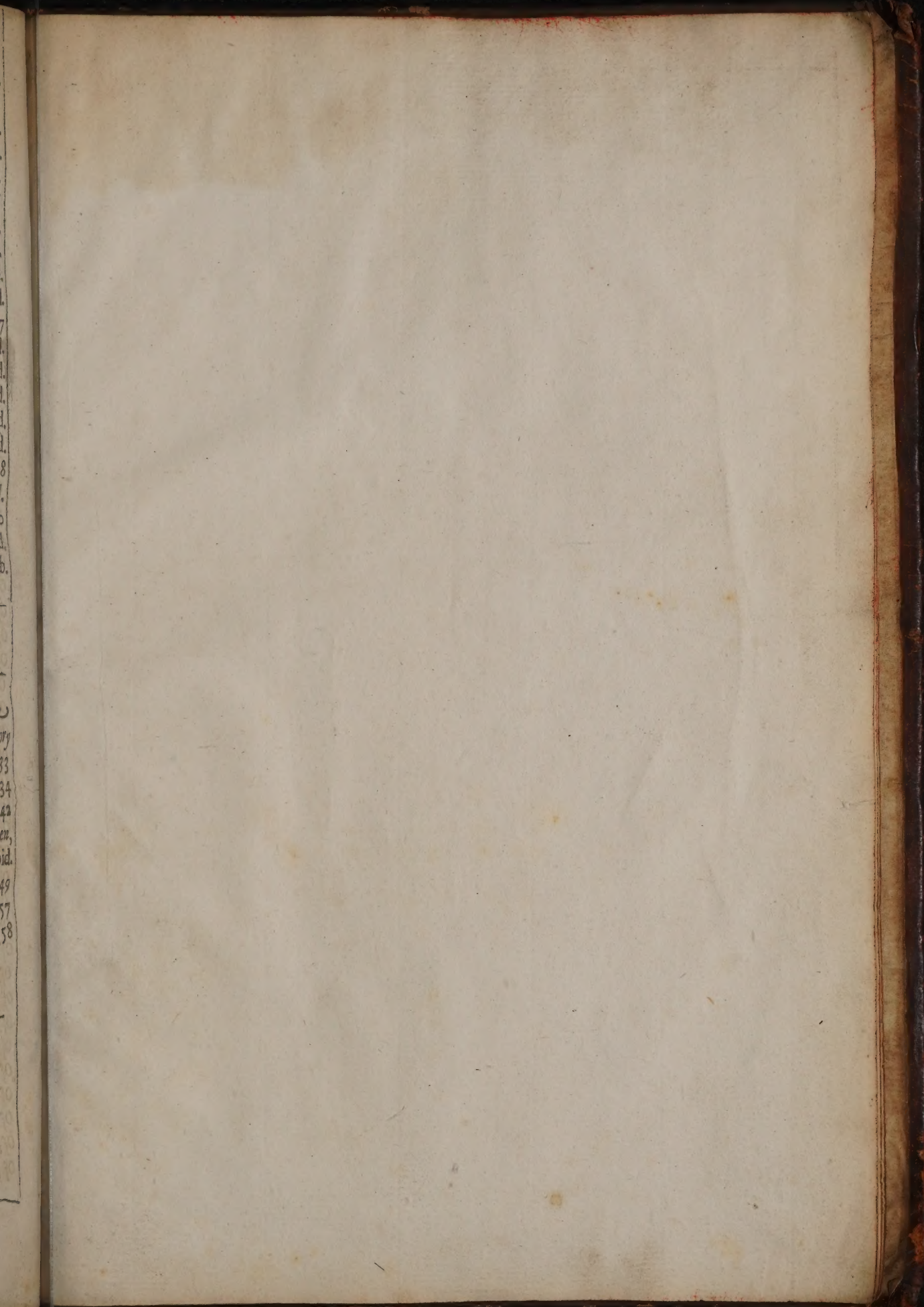
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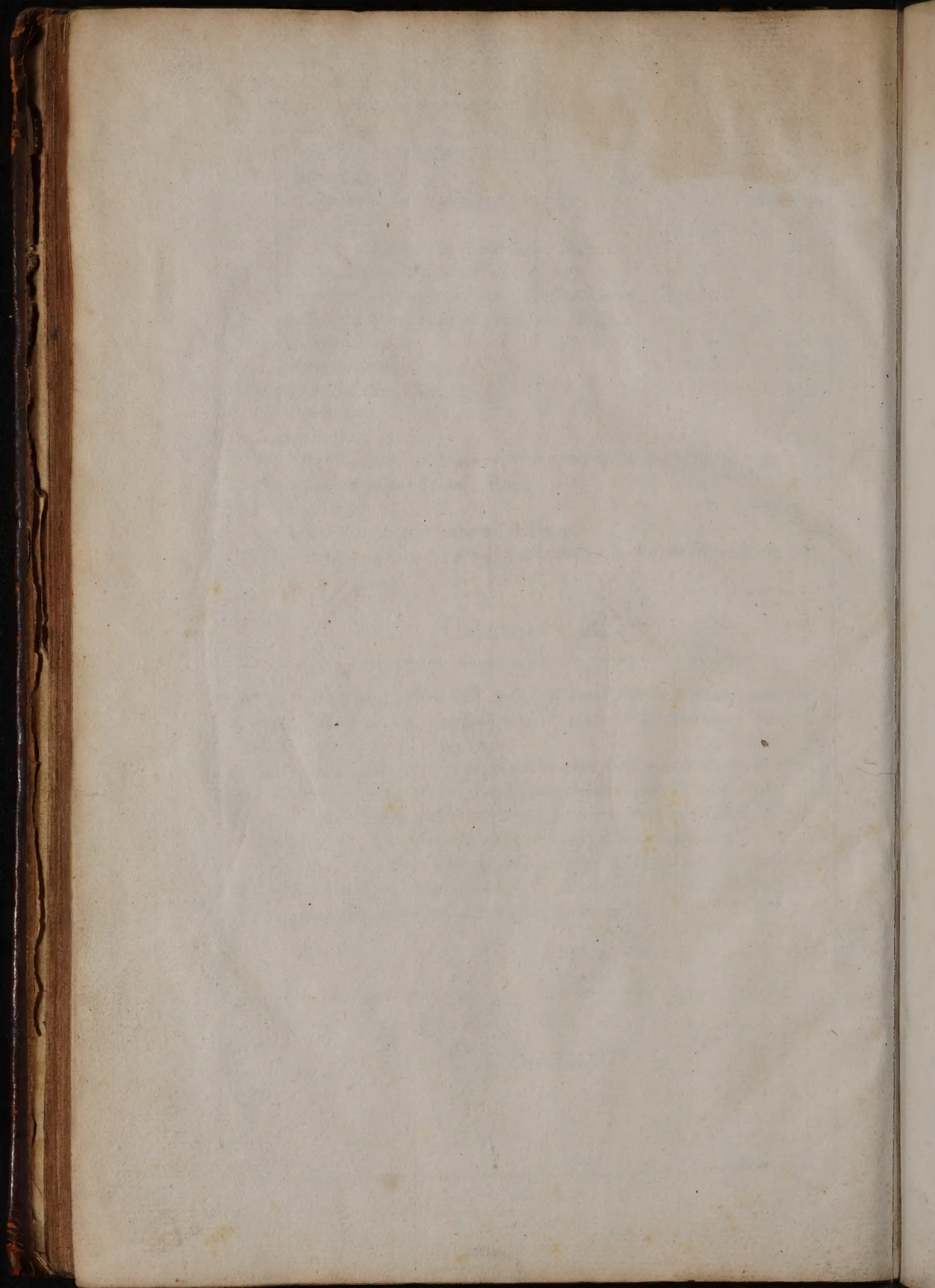
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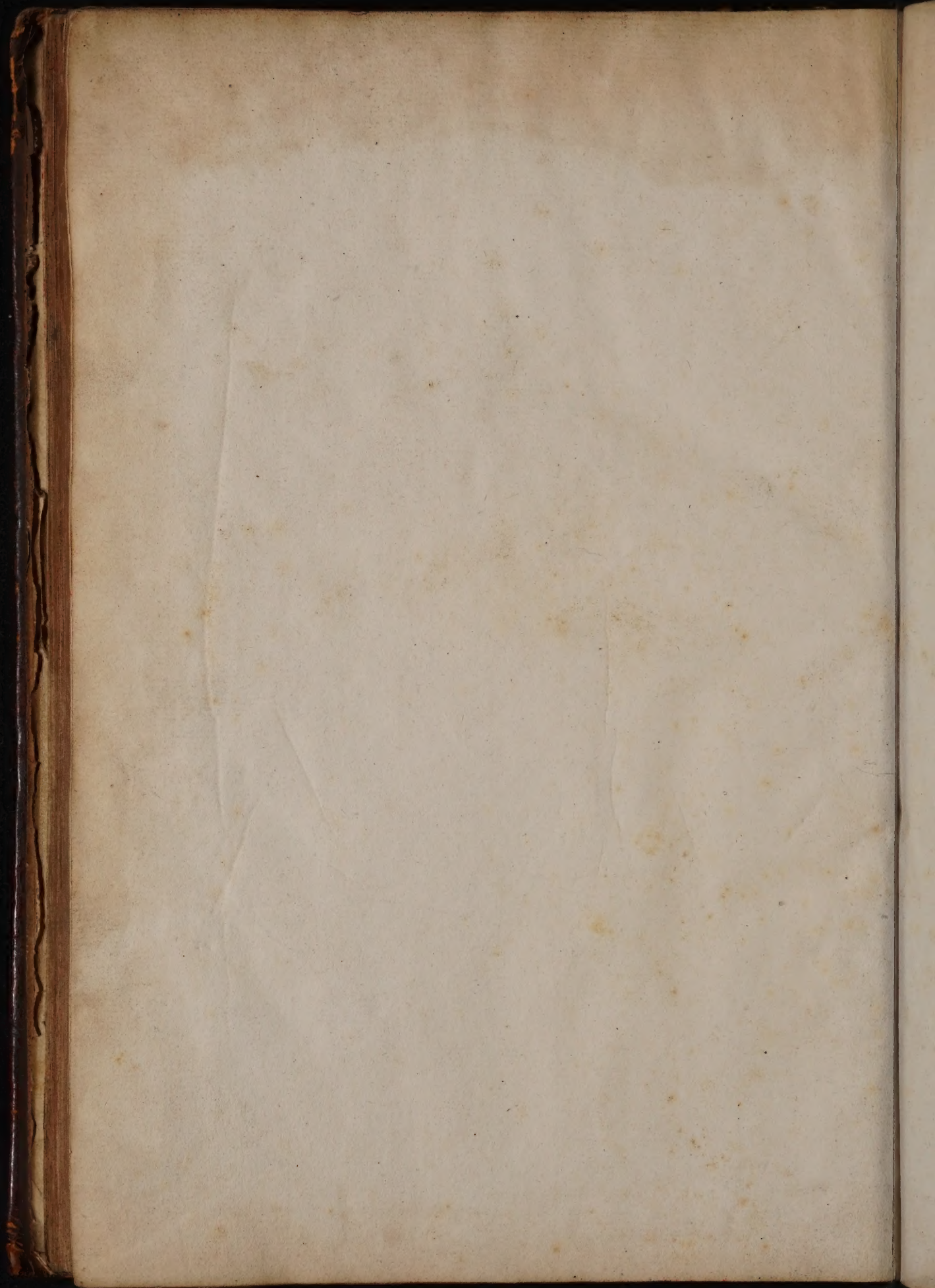
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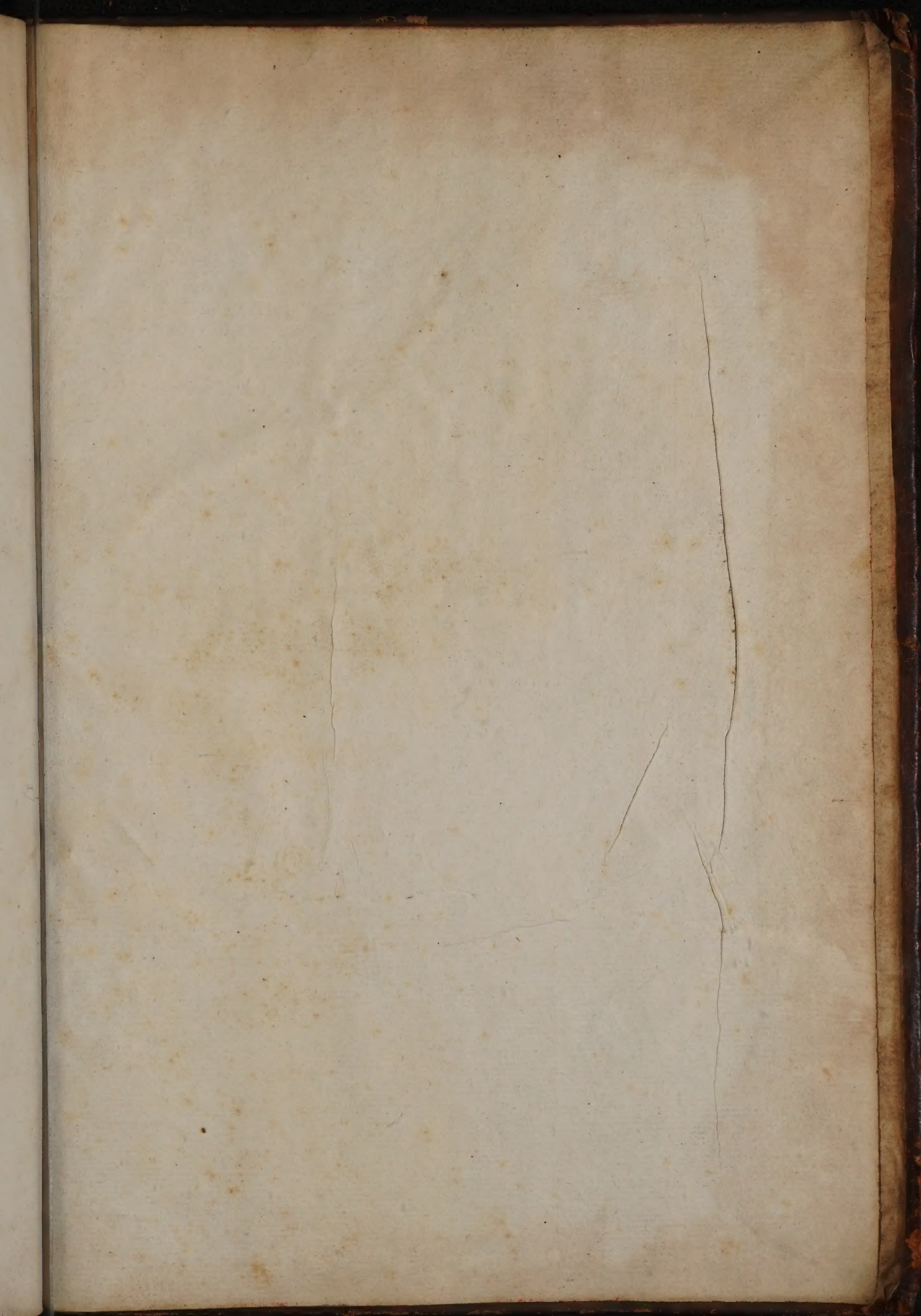
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